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TECHNOLOGY ACCEPTANCE IN A MANDATORY ENVIRONMENT: A TEST OF AN INTEGRATIVE PRE-IMPLEMENTATION MODEL.

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TECHNOLOGY ACCEPTANCE IN A MANDATORY ENVIRONMENT: A
TEST OF AN INTEGRATIVE PRE-IMPLEMENTATION MODEL.

BY

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A DISSERTATION SUBMITTED TO THE SCHOOL OF COMPUTING,
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College of Computing and Digital Media

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TECHNOLOGY ACCEPTANCE IN A MANDATORY ENVIRONMENT: A

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ABSTRACT

Technology acceptance has been studied extensively within the IS discipline. The introduction of the technology acceptance model (TAM) has given researchers the opportunity to produce a vast body of knowledge; however, existing gaps within the technology acceptance literature warrant further investigation of these understudied areas. Namely, few if any have studied end users' acceptance of newly implemented technologies within organizational contexts before end-users start using the technology. Additionally, leadership is one of the areas that has not yet been sufficiently integrated with the technology acceptance literature. The Leader-Member Exchange (LMX) theory with its roots in the social exchange theory offers us an opportunity to investigate an overlooked facet of the social influence processes, specifically, the role of the direct leader (i.e. supervisor) as it relates to technology acceptance. In this research LMX, which captures the quality of the relationship between employees and their supervisors, is introduced as a moderating variable for many of the research model's relationships. Thus, by integrating variables from multiple relevant literatures, this research attempts to answer this research question:

Will the introduction of a richer model for technology acceptance in a mandatory adoption environment, specifically in the pre-implementation phase, allow us to capture and account for the complexities of organizational technology implementations?

The research model was tested in an organizational setting where a new Content Management System was being implemented. One of the study's major findings is that it reveals a relatively different pattern of relationships between the variables within the context of this research. A majority of the hypotheses were supported and the model has displayed relatively large explanatory and predictive power. LMX's moderating role also highlighted the important role that direct supervisors play in the acceptance process; support was found that LMX strengthens the relationship between supervisor influence and behavioral intention, Perceived Behavioral Control, Appropriateness, Perceived Usefulness, Valence, and Perceived Ease of Use.

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To My father who is smiling from above.

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CHAPTER 1

INTRODUCTION

Failure to reap the “promised” and awaited benefits of Information Technologies in organizations can be safely described as a chronic problem. The often referenced Standish Group’s “CHAOS” report for 2009 delivered the following numbers: 32% of projects succeeded in the sense that they were delivered on time, on budget, and with the “promised” features, while 44% were “challenged”, which essentially means they were less than “perfect” when success was measured along the aforementioned dimensions, and finally, 24% FAILED. The failed projects were either canceled or delivered but never used. Whether the acronym “CHAOS” is intentionally referring to the state of projects within organizations or not is an issue left to those who issue the report, but for us, IS researchers, the less than impressive numbers are another proof that much work is still needed. Klein and Sorra (1996) rightly point to the increased agreement among scholars that implementation failures are becoming increasingly identified as the main cause of the inability of organizations to capture the benefits of the innovations they implement.

From an IS perspective, acceptance and system use have been the variables of choice for measuring success (Delone & Mclean, 1992, 2003). However, within organizations where most of system usage is mandatory, intention-to-use or usage by and large don’t present us with the benefit of seeing a clearer picture of how such use came to be or, more importantly, if such use is

truly representative of how end users really feel about their use. As such, user satisfaction has been suggested as a “better” measure for success when usage is mandatory (Delone & Mclean, 1992). Interestingly but not surprisingly, the user satisfaction literature has failed to provide acceptable levels of explanatory and predictive power for system usage (Wixom & Todd, 2005).

The overwhelming evidence from social psychology suggests that attitudes toward objects, such as information systems, are weak predictors of behaviors relating to those objects (Ajzen & Fishbein, 1980). Attitude theories such the Theory of Reasoned Action (TRA) and its successor, the Theory of Planned Behavior (TPB), are powerful in the sense that they provide researchers with the ability to both predict and explain behaviors (Fishbein & Ajzen, 1975; Ajzen, 1991). Their relative success in explaining and predicting behavior, such as system use, came as a result of their foundational premise that attitudes people hold toward behaviors are better predictors of their behaviors than their attitudes held toward the object of the behavior.

As new technologies, processes, procedures, and systems continue to infiltrate the world of organizations, research on potential adopters’ acceptance of innovations is still receiving attention from professionals as well as academic researchers. Developers of new technologies, senior management, and those who are responsible for managing the changes associated with the implementation of innovations are increasingly realizing that the lack of user acceptance can, and

most probably will, lead to losses in resources, not to mention the possible effects on organizations' bottom line.

Change creates a sense of uncertainty and lost control, and employees' resistance and lack of support, in addition to lower levels of acceptance represent some of the most cited causes for failures associated with organizational change. This resistance represents a major barrier for changing the behaviors of organizational members so as to use the innovation and for the organization to reap its benefits. As such, this research adopts the view that the biggest challenge for management to ensure success in new system implementations lies in getting users' buy-in and support by creating and maintaining positive attitudes toward the adoption and use of the newly implemented systems.

In organizations that are characterized by mandated adoption environments, attitudes might not align with actual behaviors, that is, an employee might hold a negative attitude toward adopting and using the new system but will ultimately do so because he/she has to. The discrepancy between the attitude that employees hold and their actual usage behavior constitute an increased dissonance that might lead to undesirable consequences such as: under-utilizing the system, reduced job satisfaction and performance, and in some extreme cases the employees might engage in destructive behaviors that will ultimately affect the organizational bottom line. Additionally, in organizations social influence plays an important role especially when a behavior is not volitional; top management,

direct supervisors, and peers do have influence in organizational settings. As such, ignoring those constructs by the technology acceptance literature limits our understanding of the actual adoption process.

What is clear is that IS research still needs to address and identify organizational mechanisms and means through which management can influence and, in a way, shape users' beliefs and attitudes toward adopting new information systems, hence reducing the possibility of failure.

This research aims at addressing some of the gaps existing in the technology acceptance literature. Specifically, this research attempts to test a research model at the pre-implementation stage of a system implementation effort in a mandatory adoption environment. By introducing relevant variables from the change management, innovation implementation, and leadership literatures, the ultimate goal of this study is to answer this major research question: *Will the introduction of a richer model for technology acceptance in a mandatory adoption environment, specifically in the pre-implementation phase, allow us to capture and account for the complexities of organizational technology implementations?*

As Figure (1) shows, the first gap this research attempts to inform, by specifically looking specifically at the pre-implementation stage of technology adoption, is the one of the temporal gaps that exist in the acceptance literature.

The technology acceptance literature hasn't addressed some of the temporal aspects of the acceptance process sufficiently, as such there seems to be a paucity of research that is specifically aimed at better understanding and exploring the pre-implementation phase of the acceptance phenomenon from a contextual perspective (Xia & Lee, 2000). This research adopts the view that the acceptance process is part of the multi stage technology implementation process. As such, looking at specific stages within that process will allow for a better understanding on how to influence end users' acceptance of new technologies within the workplace.

Technology acceptance studies have been successful in creating knowledge about the factors that affects users' acceptance of new technologies; such acceptance has been usually measured using behavioral intention and users' self-reported usage. Authors such as Szanja (1996) has cautioned against the use of self-reported usage as a substitute for actual/objective usage. Also, the bulk of the TA literature has been able to offer only little guidance to practitioners on how to manage the implementation process. This research aims to provide some guidance to practitioners and management especially as it relates to the pre-implementation phase. At the pre-implementation stage initial attitudes and expectations toward using the technology are formed. In the context of this research pre-implementation is synonymous with pre-deployment; that is the period before the new system has been rolled out and put to use. This stage extends between the time when the decision was made to adopt a certain

technology and the actual deployment of the system. The criticality of this stage stems from the fact that it is when the first communications and knowledge about the system are being sent throughout the organization. Prospective users of the new system begin to form their attitudes toward the use of the technology even before it is deployed. Such attitudes are important because they serve as cues to interpret the environment and affect end users' expectations as they relate to the system and its usage once deployed. A classic study by Ginzberg (1981) has found that the realism of the expectations of end users at the pre-implementation stage is associated with both attitudinal and behavioral success measures. Furthermore, research has found that different sets of beliefs come into play at different stages of the project. For example, Karhanna et al. (1999) findings support the premise that a different belief structure exists at different stages of the acceptance process: pre- adoption attitudes were mainly determined by a richer set of antecedents suggesting a more complex process through which users base their attitudes on, while post-adoption attitudes were mainly determined by beliefs regarding usefulness and image.

This research also aims at gaining a better understanding of the acceptance process in mandatory adoption environments. The overall technology acceptance literature didn't pay sufficient attention to the issue of the mandated use of systems; the traditional acceptance models (e.g. TAM) were originally built, tested, and validated by being applied to technologies that were mainly voluntary

in nature, that is, the users had the choice of whether to use or not use the technology. Many-if not most- innovation adoption decisions in organizations are usually made by senior management. Those initial adoption decisions are built upon the premise that employees will ultimately use the innovation. What this suggests is that there is a need to modify existing models or even build richer ones that are capable of capturing the complexities of the organizational processes that affect users' acceptance in mandatory settings. The mandatoriness concept within the context of this research is reflected in the lack of other choices for users and the fact that the decision to use and deploy the new system was made by senior management. In other words, end users have to use the system in order to perform the tasks that relate to content management (e.g Brown et al., 2002). Looking at mandatoriness from this perspective suggests that users of a system in a mandatory environment might base their perceptions of voluntariness and/or mandatoriness on a complex set of beliefs, which in turn might have differing influences on relevant variables depending on the phase of the system implementation.

Additionally, in implementation environments where usage is perceived to be mandatory, attitudes might not align with actual behavior. Stated differently, end users might have a negative attitudinal evaluation toward adopting and using the system, but will ultimately use it due to the lack of other options. Brown et al (2002) argue that the discrepancy between the attitude and the actual use lead to an increase in dissonance which might lead to undesired consequences that will

ultimately have negative effects. Such negative attitudes might cause end users to question the motives behind the introduction of the new technology and lead to the surfacing of other hindrances which might affect the implementation process.

From a technology acceptance perspective, the implication of the aforementioned arguments is that acceptance might have to be conceptualized differently. Intention to use a system by itself doesn't provide a complete picture; it might be even misleading in such environments. This study looks at acceptance as a more complex set of beliefs that go beyond the traditional Behavioral Intention variable; by introducing attitudinal components and goal commitment, this research attempts to introduce a richer representation of how end users accept new technologies.

This study also attempts to shed some light on the role of leadership in the acceptance process by moving beyond the usual "Top management support". Within the IS literature, and specifically within the technology acceptance literature, the issue of leadership per se has not been addressed directly, however, the issue of top management support and commitment has been studied extensively. A missing piece from the leadership puzzle as it relates to technology acceptance is an exploration of how top management support gets translated in the organizational hierarchy. Leader-Member Exchange is introduced in this study to better understand this missing piece. Specifically, this research attempts to explore the role direct supervisors play in the acceptance process by end users. The LMX

construct specifically measures and captures the quality of the relationship between employees and their direct supervisor. Studies that looked at LMX as it relate to change has found those who enjoy higher quality relationships with their supervisors have the strongest change climate perceptions (Tierney, 1999). Also, LMX has been found to affect the relationship between supervisors' influence tactics and those tactics' effectiveness in dealing with resistance to change (Furst & Cable, 2008). Higher quality exchanges are usually found to be less resistant to change (e.g. Van Dam et al., 2008).

The research model integrates variables from multiple disciplines and attempts to explore their role in influencing the major three dependent variables in the model, namely: Attitude, Goal Commitment, and Behavioral intention. Furthermore, LMX (Leader Member Exchange) is introduced as a moderating variable for the relationships between the main social influence variable (Supervisor Influence) and the model's variables.

By doing so, this research contributes to the technology acceptance literature by moving it beyond the dominant descriptive nature toward the more prescriptive and interventional direction where it needs to be (Venkatesh & Bala, 2008). This research is rooted in the belief that the IS discipline has the ability, and more importantly, the capacity to offer practitioners with the tools and the knowledge that might help guide the implementation process by focusing their efforts on the aspects that are most relevant to end users.

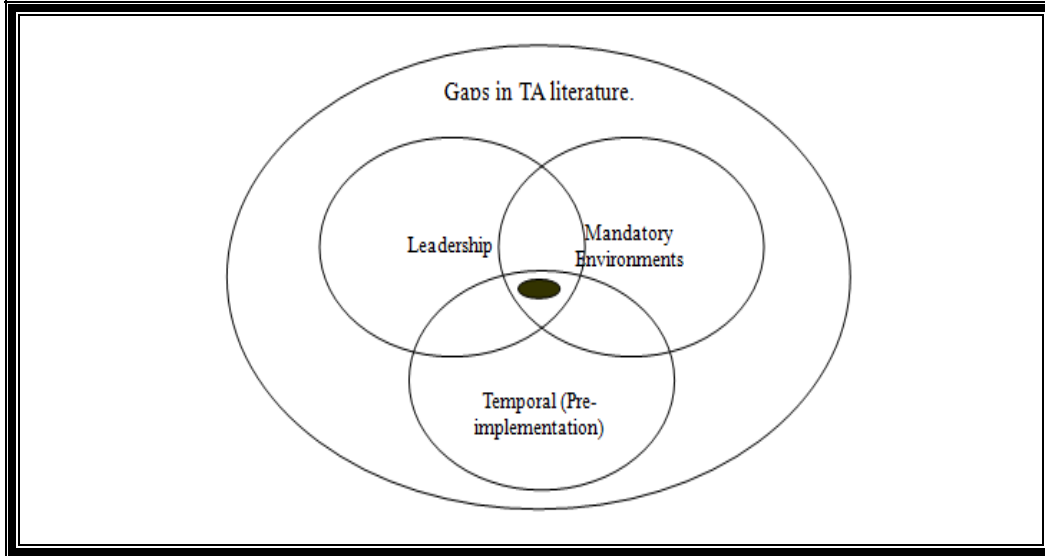


Figure 1: Graphical representation of what this research attempts to address
(Shaded area)

Table 1 presents some of the relevant articles that relate to the gaps presented in figure (1). A more thorough discussion of those articles and others is presented in the following chapter.

Gap	Examples of Relevant Studies
Temporal Aspects	Venkatesh et al. (2003) collected longitudinal data; however, data was collected after training and interaction with the system.
	Xia and Lee (2000) found that persuasion influences the formation of initial beliefs, attitude, and intention to adopt a technology.
	Ginzberg (1981) found a positive correlation between pre-implementation expectations and attitudinal/behavioral success factors.
	Marler et al. (2009) found that some variables play important role in both pre-implementation and post-implementation phases while others were more relevant at different stages.
	Herold et al. (1995) pointed to the criticality of the pre-implementation phase in shaping attitudes.
	Szajna (1996) called for incorporating experience into acceptance models based on the finding that the intention-use relationship differed between pre-implementation and post-implementation models tested.
	Karhanna et al. (1999) found that potential adopter's intention is mainly influenced by normative factors and base their attitude on a rich set of innovation characteristics.
	Melone (1991) pointed to the lack of research which looks at the formation of initial attitudes.
	Tornatzky and Klein (1982) in a meta-analysis found that compatibility and relative were constantly positively related to innovation adoption and complexity negatively related. Other variables' influence varied.
Mandatoriness of the Technology	Agarwal and Prasad (1997) found voluntariness influenced current use while it had no influence on intention to continue use.
	Hartwick and Barki (1994) found that in mandatory settings attitude toward system use was solely determined by attitude toward the system itself while in voluntary settings it was influenced by personal relevance and attitude toward the system.
	Brown et al. (2002) found a discrepancy between attitude and intention to use in a mandatory setting.
	Okunoye et al. (2006) in a qualitative study looking at an ERP implementation report on the complexity of the process where users began to question the choice process after the implementation.
	Venkatesh and Davis (2000) found that normative factors are more influential in mandatory settings.
Leadership	Neufel et al. (2007) integrated Charismatic leadership with unified theory of acceptance and use of technology and found that charisma influenced performance and effort expectancy, social influence, and facilitating conditions.
	Jeyaraj et al. (2006) found that top management support was one of the best predictors of individual IT adoption.
	Yetton et al. (1999) argued that lack of support from top management affects successful implementations.
	Gallivan (2001) found that clear and strong signal of top management support facilitate all stages of innovation assimilation.
	Igbaria et al. (1995) found that management support influence perceived usefulness and usage.
	Lewis et al. (2003) report a significant relationship between top management support and perceived usefulness and perceived ease of use.
	Speier and Venkatesh (2002) found a significant relationship between management support and image and visibility.
	Agarwal (2000) called for addressing management support at the appropriate level within organizations.
	Leonard-Barton (1987) argues that immediate supervisors are central to responses to organizational influences by employees.
Venkatesh and Bala (2008) suggested using LMX (Leader Member Exchange) theory to understand how management influences the adoption of information technologies in organizations.	

Table 1: Summary of relevant articles relating to the gaps this research attempts to address.

Prospective contributions of this research:

Beyond the introduction of a richer explanatory model of technology acceptance by integrating variables from multiple disciplines, a main goal of this research is to investigate the role direct supervisors plays in users' acceptance of a new information technology within the work place, specifically in a mandated adoption environment at the pre-implementation stage. The pre-implementation stage this research refers to represents the pre-deployment period which generally spans from the time when the decision to adopt a new system is made by senior management to the time where the system is actually rolled out. The focus of this research is on end-users and the process through which they form their beliefs and attitudes toward using a new system that will be introduced to their workplace. Such focus will allow for a better understanding of how to better manage end users' acceptance process in order to minimize resistance or underutilization.

Furthermore, this research tests one of the basic premises that led to the introduction of the modified TAM (which later dominated the literature) without the mediating attitude construct. Davis et al. (1989) argued that the direct influence of perceived usefulness on behavioral intention-which led to the removal of the attitude construct form the model, is based on

“..the idea that, within organizational settings, people form intentions toward behaviors they believe will increase their job performance, over and above whatever positive or negative feelings may be evoked toward the behavior per se. This is because enhanced performance is instrumental to achieving

various rewards that are extrinsic to the content of the work itself, such as pay increases and promotions” (pp.986).

One can argue that such statement is too generalized and ignores many aspects of the workplace environment (e.g. the role one’ direct supervisor plays in rewarding (or not) performance).

Another contribution is the introduction of goal commitment as a way to overcome the inconsistent and non-significant relationship between attitude and behavioral intention (Brown et al., 2002). Goal commitment is inherently more “binding” than, say behavioral intention. An individual committed to a goal is more likely to engage in supportive behaviors that go beyond usage or intention to use. Furthermore, the TAM and its extensions have not sufficiently looked at pre-implementation contexts. The studies that looked at “pre-adoption” such as Venkatesh and Davis (2000) took measures of users’ reactions post-training (which might have influenced the users’ reactions). Additionally, such measures were limited in the sense that they were “constrained” to traditional measures which were included in the respective models, thus possibly ignoring variables that might have significant influence on users’ reactions. More research that looks at pre-implementation contexts is needed to shed some light on beliefs other than the traditional ones used in the literature (Frambach & Schillewaert, 2002; Karahanna et al., 1999; Venkatesh & Bala, 2008).

CHAPTER 2

LITERATURE REVIEW AND THEOROTICAL BACKGROUND

Overview: A road map for the literature review

Next is a brief review of the Technology Acceptance Model (TAM) which became almost synonymous with the cross-disciplinary term of technology acceptance (TA) due to its dominance in the literature. Throughout the review TAM will be mentioned repeatedly due to its aforementioned dominance, but that doesn't mean that it is the only model or theory that attempted to address the technology acceptance phenomenon. As a matter of fact, the TAM can be considered a special version of its foundation, the theory of reasoned action (TRA). The contributions of the research that developed around TAM makes it that much more central to the general technology acceptance literature. Venkatesh et al. (2003) developed a unified theory of technology acceptance and use (UTAUT) based on the most dominant models and theories that were used in the literature. In the same paper the authors provide a review of those theories and how they have been utilized by IS researchers to study the acceptance phenomenon.

After briefly reviewing the TAM, the model is viewed through a critical lens. This critical view of TAM will allow for a deeper understanding of the gaps that exist in the overall technology acceptance literature. Generally speaking, the literature had little to say about:

- 1- The temporal aspects of the acceptance process.
- 2- The issue of mandatory vs. voluntary adoption.
- 3- The treatment of the attitude construct in the context of a mandatory adoption environment.
- 4- How the issue of leadership has been addressed as it relates to the acceptance process.

Following the review of the gaps is the introduction of the research model and its theoretical foundation. The research model integrates variables based on research findings from the innovation implementation, change management, and the leader-member exchange literatures. The respective literatures are then reviewed with the focus being on aspects that are directly related to what this research attempts to achieve.

The Technology Acceptance Model (TAM):

Within the IS discipline the Technology Acceptance Model (TAM) has emerged as the most dominant model for explaining and predicting usage behavior (Davis, 1989, Davis et al, 1989). The technology acceptance model (TAM) theorizes that the intention to use a prospective system is mainly influenced by two factors: its Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The TAM was adapted from the Theory of Reasoned Action (TRA) which theorizes that the direct antecedent to a behavior is the intention to perform it. Behavioral Intention is a function of two constructs: Attitude toward the

behavior and the Subjective Norm. The attitude construct captures the positive or negative feelings and evaluations that an individual has toward performing the behavior, while the subjective norm captures the social influence aspects in performing the behavior, that is, the perception of whether relevant others think that one should or shouldn't perform the behavior.

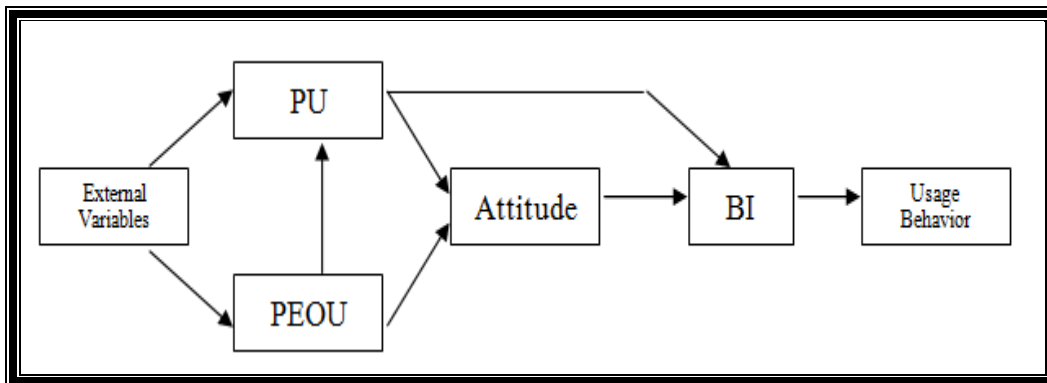


Figure 2: The Original Technology Acceptance Model (TAM) (Davis et al, 1989)

Staying true to its roots in the TRA, the original TAM postulates that the intention to use a technology is mainly influenced by two belief constructs: The perceived usefulness and the perceived ease of use. Perceived Usefulness (PU) refers to prospective user's perception that using the technology in question will increase his/her performance. Perceived Ease of Use (PEOU) is intended to capture perceptions about whether users' technology use will be free of effort. One area of deviation from TRA was that the original TAM, contrary to what TRA suggests, included a direct link between PU and behavioral intention. Thus in the original TAM, behavioral intention is determined by both attitude and perceived usefulness. The TAM ultimately discarded the attitude and subjective norm

constructs-an issue which will be discussed later in the literature review (Davis, 1989).

In their original paper which introduced the TAM, Davis and his colleagues (1989) argue that the goal of the TAM is “*to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified.*” (p.985). They further argue that the model will allow for testing the impact that relevant and important external variables might have on the model’s key variables. TAM postulates that the effects of those external variables will be fully mediated by perceived usefulness and perceived ease of use beliefs.

Within the TAM, the Attitude (A)-Behavioral Intention (BI) relationship is based on the TRA premise that people will intend to perform a behavior which they positively evaluate. The other important relationship which later in the literature will become the most dominant in the model is the PU-BI relationship. Davis et al (1989) argue, based on expectancy theory on work motivation (Vroom 1964), that prospective users will intend to use a system or a technology based on the premise that it will lead to increased performance. The underlying assumption is that prospective users will link their usage and the resulting increased performance to extrinsic rewards. By using “cognitive decision rules” (pp. 986)

prospective users “skip” the affective step (i.e. the formation of attitude toward the behavior) and rely on “rules” that link the behavior to rewards.

Furthermore, Subjective Norm which is central to the TRA and the later Theory of Planned Behavior (TPB) was not included in the TAM “because of its uncertain theoretical and psychometric status.” (pp.986). The implications of the instrumentality assumption and exclusion of SN are discussed later in the review. The other relationship in the model (PEOU-A) is based on the premise that self-efficacy beliefs will have direct effects on one’s attitude (Bandura, 1982). The easier a user feels that the system is to interact with, the more intrinsically motivated he/she will be, thus affecting the attitude. Additionally, the easier the system to interact with the more it enables increased performance, hence the PEOU-PU relationship. Worth mentioning here that while the TRA argues for eliciting beliefs from the relevant population each time a researcher is interested in predicting and/or explaining a behavior, TAM postulates that PU and PEOU are the main determinants of intentions across populations and contexts.

The TAM in the IS literature:

The dominance of the TAM within the IS literature is clear. In a 2007 issue of the Journal of the Association of Information Systems (JAIS) dedicated to the TAM, it was estimated that the TAM journal publications had taken an estimated 10% of the *overall IS journals space* (Hirschheim, 2007). Furthermore, the two papers that introduced the TAM (Davis et al, 1989; Davis, 1989) have been cited

over 1000 times (Venkatesh et al, 2007). The specificity of the TAM to the IS field and namely to systems acceptance allowed for the model to be tested and extended across various types of technologies, users, and cultures.

For example the TAM was tested on word processing tools (Davis et al, 1989; Davis, 1989), the world wide web (Agarwal & Karahanna, 2000), Computer banking systems (Brown et al, 2002; Adamson & Shine,2003), e-mail (Davis, 1989; Malhotra & Galleta, 1999; Gefen & Straub, 1997), Graphics software (Venkatesh & Davis, 1996), mobile banking (Laurin & Lin, 2005), spreadsheet software (Mathieson, 1991), online shopping (Gefen et al, 2003), ERP systems (Amoako-Gyampah & Salam, 2004), groupware (Lou et al, 2000), on-line gaming (Hsu & Lu, 2004), and telemedicine (Chau & Hu, 2002).

From a chronological evolutionary perspective, Lee et al. (2003) suggest that the TAM has evolved through periods, which were characterized and labeled based on the nature and the goals of the studies that tackled the technology acceptance phenomenon by utilizing the TAM. Specifically, they argue for a four steps evolutionary, yet overlapping, model. During the first period which they label as “the introduction period” most of the studies were aimed at replicating and comparing the model to other competing models. Within the second period, which chronologically overlaps with the first one, many studies attempted to validate the TAM and its measurement scales. In the third period, which one might argue is still in progress, TAM studies extended the model.

Along the same lines, Wixom and Todd (2005), in their attempt to integrate the user satisfaction and the technology acceptance literatures, introduce a simple yet comprehensive way to organize and describe how the TAM has been extended by researchers. The first extension approach involves introducing factors from related models such as the Theory of Planned behavior (e.g. Taylor & Todd, 1995). The second approach can be characterized by the introduction of additional belief factors (e.g. Hsu & Lu, 2004). In the third approach, external variables to the main belief factors PU and PEOU were examined (e.g. Agarwal & Prasad, 1999; Karahanna & Straub, 1999). Lee et al. (2003) provide a comprehensive review of the external variables that have been used in the TAM literature. The final period, which they labeled “the model elaboration period”, is mainly characterized by the development of newer versions of the TAM to address the limitations of the original model. Models such as TAM2 (Venkatesh & Davis, 2000), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003), and the most recent TAM 3 (Venkatesh & Bala, 2008) has been introduced during that period.

TAM meta-analyses:

Several meta-analyses of the TAM were conducted in order to make generalized statements about the convergence and/or divergence of the many studies’ findings (Legris et al., 2003; Lee et al., 2003; Yang & Yoo, 2004; King & He, 2006; Schepers & Wetzels, 2007). Findings suggest that the perceived

usefulness (PU) - Behavioral-intention (BI) relationship has been the most consistent with strong support for the relationship between the two variables. Furthermore, the relationship between PEOU and PU has been strong and supported across many studies. On the other hand the relationship between PEOU and BI was less consistent. Temporal factors such as experience play an important role in moderating the strength of the relationship between the two variables with stronger relationship reported at early stages (Lee et al., 2003).

On the issue of external variables and their role in the model, Legris et al. (2003) find support for the premise that PU and PEOU fully mediate the effects of external variables on intention and ultimately use, thus adding little to the predictive validity of the model. This finding is consistent with the arguments suggesting that individual differences should be dropped from models and theories such as TAM (Agarwal & Prasad, 1999). On the other hand, antecedents of PU and PEOU provide us with a better understanding of the factors that influence both beliefs. This understanding can be critical in designing interventions that will ultimately affect users' reactions (e.g. Venkatesh & Bala, 2008). Additionally, research suggests that the assumption of full mediation is overstated (Burton-Jones & Hubona, 2006). External variables might have a strong direct effect on usage and the mediation of external variables is contingent on the technology and the external variables being considered (Burton-Jones & Hubona, 2005)

The use of students as research subjects has also been identified as an issue warranting further attention (Legris et al., 2003). Schepers & Wetzels (2007) found that the use of student samples in many studies has significantly affected the strength of the relationship between the model's variables. Studies involving students generally report stronger relationships between the model's variables. Furthermore, the type of the applications studied has been found to moderate the model's pairwise relationships. Legris et al. (2007) suggest that more focus should be directed toward studying business process applications. By the same token, culture (western vs. non-western) has been mentioned as moderator. For example, it has been found that PU seems to carry more weight in western cultures, while PEOU appears to be of greater relevance in non-western cultures.

Overall, the literature seems to agree that the TAM's foremost strength is its parsimony (Bagozzi, 2007). The TAM has consistently allowed for explaining a substantial proportion of the variance in intentions and usage behavior (Venkatesh & Davis, 2000). The TAM has also found consistent support across multiple settings and technologies. Furthermore, it is easy to apply and test because of its aforementioned parsimony; by measuring perceptions of usefulness and ease of use developers and implementers can get a sense of how successful applications will be. This parsimony allowed researchers to test additional constructs and at the same time be able to accommodate many variables of interest.

The TAM from a different perspective:

Recently researchers began to take a more critical approach when looking at the TAM and the literature that developed and evolved around it (e.g. Lee et al., 2003). It has been argued that even though the parsimony of the TAM has been its main strength it also became, in a way, a limitation and a liability. The TAM might have enabled the building of narrow cumulative tradition (Benbasat & Barki, 2007). A tradition that can be characterized as an incremental one with a little added to our knowledge in each step along the way. Critics suggest that the simplicity and the rigor of the model became an attraction to this stream of research thus limiting the attention that would otherwise have been paid to other streams (Lee et al., 2003; Benbasat & Barki, 2007; Straub & Burton-Jones, 2007). The parsimony of the TAM might have served the acceptance literature by focusing researchers' efforts and allowing for highly predictive models but it also limited our understanding of the acceptance phenomenon. However, it is not fair to direct criticism at the TAM for getting so much attention.

Interestingly, looking at the bigger picture and seeing how the TAM has evolved over time (TAM2, UTAUT, TAM3) one is stricken with how the integrative TAM(i.e. UTAUT) is now looking more than ever like its origin, that is the TRA, and to be more precise the Theory of Planned Behavior. The UTAUT constructs of social influence and facilitating conditions are extremely similar to the TPB's subjective norm and perceived behavioral control (Benbasat & Barki, 2007). It is as if the literature has went through the long process of building a

tradition that essentially ended up looking like the theory from which the TAM has originated. Research utilizing the TAM has been also characterized by the extensive use of student samples, the simplicity of the applications tested, and the use of self-reported measures (Lergris et al., 2003; Lee et al., 2003; Venkatesh et al., 2003). Additionally, the issue of common method variance has been raised recently (Straub Jr. & Burton-Jones, 2007).

Further limitations of the literature generated from the TAM that are more relevant to this research include the issue of parsimony versus richness. Plouffe et al. (2001) pointed out that even though parsimony is an important issue, context plays an important role that shouldn't be ignored. Building richer models that take context into account is essential to the advancement of the discipline. Reactions by individuals to new information systems and technologies are expected to be influenced by the where, the how, and the when issues as they relate to the implementation process. This research adopts the view that richness is of great importance because it not only adds meaning, but also helps in capturing and understanding the complexities of the system implementation process.

Next is a review of some of the existing gaps in the acceptance literature. By looking at what has been said about those gaps as they relate to the acceptance phenomenon one can focus on aspects that this research attempts to address.

The Gaps: What this research attempts to fill

This research is aimed at addressing some of the gaps in the technology acceptance literature within the IS discipline. Specifically this research attempts to fill in some of the gaps existing in the literature with regards to three main areas. The first area this research attempts to address, by specifically looking at the pre-implementation stage of technology adoption, is the temporal gaps existing in the acceptance literature. Secondly, this research aims at gaining a better understanding of the acceptance process in mandatory adoption environments. And finally, it attempts to shed some light on the role of leadership in the acceptance process by moving beyond the usual “Top management support”.

Even with all the success that the TAM has been able to achieve, it still fails to provide guidance on how to manage the process. Venkatesh et al. (2003) point to the fact that even though technology acceptance models in general might generally provide us with an idea about users’ intentions and usage behaviors, where they fail is in providing guidance to designers. However, what was not mentioned is that technology acceptance as a process is not only relevant to system designers but also to those who are concerned with the implementation aspects of it. Klein & Sorra (1996) argue that in most cases of innovation implementation failures, the burden falls not on the innovation itself but rather on the implementation process.

Recently, Venkatesh & Bala (2008) introduced TAM3 and argued for a research agenda which points to the fact that more research is indeed needed with regards to the implementation aspects of technology acceptance. They attempt to redirect the technology acceptance research toward a more practical orientation. This latest trend of moving the technology acceptance research toward building richer and more practical models might be a response to the recent criticisms of TAM as it represents the most dominant model in the technology acceptance literature. For example, in the Lee et al. (2003) paper, a leading IS researcher is quoted saying: *“imagine talking to a manager and saying that to be adopted technology must be useful and easy to use. I imagine the reaction would be “Duh! The more important questions are what make technology useful and easy to use.”* (pp. 766).

Criticisms of the TAM also include its lack of means to account for temporal aspects of the technology acceptance process (Orlikowski & Iacono, 2001). Legris et al. (2003) point to the fact that the technology acceptance literature treats IT implementation as being independent from organizational dynamics. Thus, while attempts have been made to integrate other research streams with TAM (e.g. Wixom & Todd, 2005); limited efforts have been aimed at integrating the TAM with the innovation implementation (e.g. Klein & Sorra, 1996) and change management literatures. Innovation implementation issues can have great influence on various beliefs that will ultimately affect usage behavior and attitudes, thus it is imperative that IS research should pay more attention to

such important, yet overlooked, issue. Worth mentioning here, that the innovation implementation literature is being viewed as a sub category of the greater innovation literature.

Technology acceptance: A temporal perspective

The technology acceptance literature hasn't addressed the temporal aspects of the acceptance process sufficiently, as such there seems to be a paucity of research that is specifically aimed at understanding the temporal aspects of the acceptance phenomenon (Xia & Lee, 2000). Longitudinal studies that examined different antecedents of the main TAM constructs and time effects of the model's relationships didn't treat different times as different stages. Both TAM2 and UTAUT mainly looked at how the time of measurement affects the strength of the relationships between the model constructs and their relative influence on constructs across time.

However, what has been overlooked is the possibility that beliefs different from the "traditional" ones might come into play at different stages of the acceptance process. Conceptualizing acceptance as a part of the multi stage technology implementation process, a view adopted in this research, have implications on the way one is to view acceptance as it relates to time (Cooper & Zmud, 1990). To move beyond the dominant way of treating time within the TA literature one has to explore how the temporal dimensions of acceptance has been addressed in the literature. The implication of this view is that if one is to look at

the technology acceptance phenomenon as a multistage process (Cooper & Zmud, 1990), one should expect and accept the possibility that factors other than the traditional PU, PEOU, and the innovation characteristics (Davis, 1989; Moore & Benbasat, 1991) might have a role to play at different stages. The innovation implementation literature (e.g. Klein & Sorra, 1996) and the change management literature (e.g. Armenakis et al., 2007) have the ability to offer insights that might be helpful in building richer models which incorporate additional relevant belief factors.

Due to its dominance in the TA literature, one should begin by looking at how time has been utilized and approached in the original TAM (Davis et al., 1989). In their seminal paper, Davis and his colleagues incorporated time in their model by attempting to determine “how well do intentions predict usage?”(pp. 989). Specifically, they tried to explore how reliable intentions were in predicting future usage. By measuring the intentions of prospective users after a one hour introduction to word processing software and their usage after a fourteen week period, they report a .35 correlation between the two. The logic behind the test is to prove that simple models such as TAM can guide managerial interventions with regards to the adoption of information systems in the workplace. By proving that intentions can predict future usage, Davis and his colleagues suggest that PU, PEOU, and intention, if measured early, can help management make more informed decisions and may help developers test prototypes before a complete system is developed and implemented(i.e. Deployed). In a way, they attempted to

introduce the TAM as a diagnostic tool. What's missing from the picture, however, is the complexity of the implementation process, not to mention the treatment of time as peripheral to the acceptance process; it is almost absent (Orlikowski & Iacono, 2001).

Szajna (1996) tests revised versions of the TAM which were modeled as a pre-implementation and post-implementation version. The study further looks at how the TAM variables explain both self-reported usage and actual system use and found that PU and not PEOU has direct effects on intention. In the post implementation version, PU had direct effect on self-reported use but not on actual use. More important to the temporal dimension is that Szajna (1996) argues that the findings of the study support further consideration of "experience".

Venkatesh and Davis (2000) incorporate experience in TAM2. They tested for the effects of users' experience using the system over a period of time on social influence processes and cognitive instrumental influences. Of the social influence processes only identification (SN \square Image \square PU) was consistent over time. While cognitive instrumental processes (Job relevance \square PU, Output Quality \square PU, Result demonstrability \square PU, PEOU \square PU) were found to be significant throughout. The UTAUT also incorporates experience and tests of the model found support for the influence of effort expectancy on intentions at early stages of experience. The same support was found for the social influence-behavioral intention relationship.

Worth mentioning here is that the UTAUT included interaction effects among the moderating variables (Age, gender, voluntariness, and experience) which were tested in the model (Venkatesh et al., 2003). By the same token, Thompson et al. (2006) incorporate experience in their integrated model of technology acceptance and report finding similar results to those reported by previous research. They differ, however, in their acknowledgment of the challenging nature in conceptualizing experience in the sense that it might reflect skills gained through use, habit, or exposure- something which has been absent in earlier literature. One can further argue that experience is only one part of the temporal dimension of the acceptance process. If we are to accept the view that acceptance of a technology is a process then we must be able to acknowledge the possibility of other variables coming into play at different stages (e.g. Karhanna et al., 1999).

The research described up to this point has only dealt with the effects of time by conceptualizing it as “experience” in the sense that it is more concerned with the prospective users’ interaction with the system over time. The implication of this dominant view is that the attention becomes solely focused on the “traditional” acceptance variables’ while ignoring other contextual ones that might have some influence at different stages of the process. Other research found that current usage was not a significant predictor of future use intentions (Agarwal & Prasad, 1997). The implication of such finding is that the variables that predict current use might not be as influential in predicting future use, that is,

institutionalized use. Also, Unrealistic expectations which will be ultimately disapproved with increased experience and usage of the technology has also been found to contribute to more resistance and less utilization of the technology (Speier & Venkatesh, 2002; Bhattacharjee & Premkumar, 2004). Furthermore, in the innovation diffusion literature it is suggested that relative advantage, complexity, and compatibility are the only variables consistently related to innovation adoption, while other variables influences varied (Tornatzky & Klein, 1982).

In a notable study, Karahanna et al (1999) use the theory of reasoned action as a theoretical base for testing the differences between pre-adoption and post adoption with regards to the underlying beliefs and attitudes. They use a wider set of beliefs which originated from the diffusion of innovation theory (Moore & Benbasat, 1991) in an attempt to expand beyond the extensive use of PU and PEOU. The findings support the premise that different belief structure underlies each outcome at the different stages; pre- adoption attitudes were mainly determined by a richer set of antecedents suggesting a more complex process through which users base their attitudes on, while post-adoption attitudes were mainly determined by beliefs regarding usefulness and image. Most of the studies within the technology acceptance literature looked at the belief structure of users who have already adopted the technology, thus what many of these studies were measuring is the intentions to continue use (Karahanna et al., 1999). Furthermore, most of those studies approach acceptance with the preconceived belief that the

most important variables for explaining usage intention are those that already dominate the existing literature.

Recently Venkatesh and Bala (2008) reiterated the importance of experience as a moderating variable in technology acceptance models and introduced what they termed “interventions” as a way to bridge some of the gaps existing in the literature. Still, those interventions are suggested to be treated as external to PU, PEOU, and their determinants. This almost “holy” treatment of PU and PEOU goes against the soul of TRA and limits our understanding of the acceptance process at different stages. Changes in key perceptions over time, as the reviewed literature suggests, represent a critical element in understanding technology acceptance. Still, as mentioned earlier, most models ignored the inclusion of new belief variables into technology acceptance models as way of testing whether other beliefs might be influential at different stages.

Many scholars called for more research aimed at understanding the temporal aspects of technology acceptance. Kwon and Zmud (1987) argue for more research aimed at exploring technology adoption within the complexities of contextual factors that might come into play at the different stages of the implementation process. Additionally, there is little research that looks at the formation of initial attitudes about technologies and the temporal changes in such attitudes (Melone, 1991). Furthermore, it has been argued that innovation diffusion theory is silent about how attitudes are formed (Karahanna et al., 1999).

In the same study Karahanna et al. suggest that future research should look at how persuasion efforts might affect relevant beliefs and attitudes. Xia and Lee (2000) find that persuasion and training can help shape initial attitudes and influence users' perceptions. They further argue that such perceptions should be monitored overtime. Speier and Venkatesh (2002) acknowledge that there exists a possibility that additional factors beyond the traditional acceptance variables might come into play when attempting to understand the process of getting users' buy-in. They suggested "*a more proactive set of measures...*" (pp.109). Bhattacharjee and Premkumar (2004) call for more research that moves beyond the traditional static model. And most recently, Venkatesh and Bala (2008) argue for more attention to pre-implementation interventions as a way to become more proactive in managing users' perception at such early stage and to minimize resistance.

Technology Acceptance: Voluntary vs. Mandatory

Many-if not most- innovation adoption decisions in organizations are usually made by senior management. Those initial adoption decisions are built upon the premise that employees will ultimately use the innovation. However, reality makes it clear that successful implementation requires committed usage by the organizational members, thus when employees limit their usage and the system is not institutionalized the question of "why did we fail" arises. Klein and Sorra (1996) highlighted that implementation failures are becoming the main cause of why many organizations don't reap the anticipated benefits of the innovations they implement.

The overall technology acceptance literature paid little attention to the issue of mandated use of systems. The traditional acceptance models (e.g. TAM) were originally built, tested, and validated by being applied to technologies that were mainly voluntary in nature, that is, the users had the choice of whether to use or not use the technology. While those models have been very useful and successful in voluntary settings, their value in explaining and predicting use in mandatory environments has not been addressed sufficiently. The traditional models neglect of the complexities of technology implementation within organizations casts even more doubt on their utility, especially in reflecting the realities of the acceptance process when the initial adoption decisions are made at higher levels. The implication of such view is that traditional models-to put it mildly- were built on a less than perfect assumptions, thus suggesting that there might be a need modify existing models or even build new richer ones (Gallivan, 2001).

In the technology acceptance literature, perceived voluntariness is defined as the “*degree to which use of the innovation is perceived as being voluntary, or of free will.*”(Moore & Benbasat, 1991:p.195). Simply put, it is the perception of the extent to which one *has to* use the system. The TRA, upon which TAM was built, assumes volitional control, that is, it aims at explaining and predicting a behavior that is under one’s control, thus limiting the range of behaviors that it can be applied to.

To address this issue the TPB introduces the construct of perceived behavioral control (PBC) which refers to “people’s perceptions of the ease or difficulty of performing the behavior of interest.” (Ajzen, 1991; p.183). Ambiguity and confusion persisted with regards to the concept of PBC. To address those issues Ajzen (2002) attempted to clarify some of the issues surrounding PBC. He suggests that PBC is comprised of two components: Self efficacy which is concerned with perceptions of ease or difficulty of performing a behavior, and controllability, that is the extent to which the performance of the behavior is up to the actor. The controllability component of PBC, one can argue, might have led to some confusion with regards to the issue of voluntariness (e.g. Karahanna et al., 1999). Rawstorne and his colleagues (2000) tested the value of adding PBC to the TPB in explaining usage behaviors in a mandatory setting and found that it only enhanced prediction and explanation marginally. Additionally, the elicited control beliefs made no reference to the mandatory nature of the technology being implemented but rather to external and internal factors that might hinder use of the system. Both the TRA and the TPB speak of volitional control but not voluntariness. To understand the difference one has to look at the subtle difference between the “has to” in the definition of voluntariness and “up to” in PBC’s controllability component. Looking at the issue from a different angle one can also argue that the absence of volitional control from TRA and TPB perspective will hinder the actor’s *ability* to perform the behavior, while in the case of mandatoriness (i.e. non-voluntary) it will be more about hindering an actor’s *will* of not performing the behavior (Rawstorne et al., 2000). One can

further argue that in the case of mandatory adoption consequences of not adopting the technology will be more salient.

Hartwick and Barki (1994) argue that both voluntary and mandatory use is under one's control. In mandatory use environments normative components will dominate, while in voluntary environments attitudinal components will be more influential. Karahanna et al (1999) also found that adoption is solely determined by normative influences while continued use is determined by attitudinal considerations along with the perceptions of mandatoriness. The literature looks at voluntariness in different ways. Hartwick and Barki (1994) applied the TRA and compared between users who perceived their adoption as mandatory and those who perceived it as voluntary. They further argue that even in mandatory settings usage can vary, thus it can and it should be studied.

The assumption that usage will vary even in mandatory contexts adds further support to the calls for directing more research that is specifically aimed at mandatory settings (e.g. Rawstone et al., 1998; 2000). Agarwal and Prasad (1997) found that voluntariness has significant influence on explaining current usage while it has no significant influence on future intentions to continue usage. Based on their findings, they suggest that forcing usage might be important in influencing initial adoption decisions among users, but that users will eventually rely on more instrumental beliefs for their continued usage. This temporal change with regards to beliefs influencing usage behavior is consistent with other

findings (Venkatesh & Davis, 2000; Venkatesh et al., 2003). Another possible explanation would be that users, in order to avoid cognitive dissonance, rationalize their behavior along the way; that is, they might try to find rational explanations to convince themselves that their use is not forced (Salancik & Pfeffer, 1978). For example, it has been reported that in mandated environments attitude toward system use is solely determined by attitude toward the system (the system is good, thus my use is good) while in voluntary settings attitude toward system use is mainly influenced by personal relevance and the goodness of the system (Hartwick & Barki, 1994). What this might suggest beside what was mentioned earlier is that we are not fully capturing the way forced adopters feel about the system even though they are rationalizing their usage behavior.

Along the same lines, Karahanna et al (1999) found that the decision to adopt is solely determined by normative influences while continued use is determined by both attitudinal considerations and the degree to which usage was perceived to be mandatory. In the same study, potential adopters viewed the technology as mainly voluntary, while users viewed their continued usage as more mandatory. In that study voluntariness was modeled as a direct antecedent to both intention to adopt and intention to continue use. What is interesting is that potential adopters were mainly influenced by normative pressures; in the TA literature normative influences were found to be more relevant in mandatory environments (e.g. Venkatesh & Davis, 2000). The findings of the study highlight the difference between normative influence and voluntariness. Additionally,

technology acceptance research treats voluntariness as a moderating variable for the SN-BI relationship which captures the previously mentioned compliance effect (e.g. Venkatesh & Davis, 2000; Venkatesh et al., 2003; Schepers & Wetzels, 2007; Venkatesh & Bala, 2008). Voluntariness was also found to have a direct effect on relative advantage (Speier & Venkatesh, 2002).

Attitude in mandatory adoption environments:

In an important study Brown et al (2002) questioned the explanatory power of the TAM in a mandated use environment which they defined as a one “*in which users are required to use a specific technology or system in order to keep and perform their jobs.*” (pp283). They argue that even though the TAM and its extensions did well in both mandatory and voluntary environments, the underlying assumption with regards to mandatoriness may have only considered the issue of necessity. They suggest that mandatoriness is a more complex concept involving the degree to which a system is necessary to perform one’s job and the degree to which the use of the system is integrated across users. This argument may suggest that users of a system in a mandatory environment base their perceptions of voluntariness and/or mandatoriness on a more complex set of beliefs, which in turn might have differing influences on relevant variables. Brown et al (2002) specifically attempted to show that in an environment which is highly integrated and where using the system is the only way to perform one’s tasks, the TAM will not be as powerful as other models (namely TPB) in

explaining usage behavior. Their results show a different pattern of relationships than those usually reported in the literature.

Brown et al (2002) tested three models: TAM without the attitude construct, the original TAM, and the TPB. In the first model PEOU dominated in explaining behavioral intentions, a finding that the authors described as misleading based on qualitative data which showed that many users didn't perceive the system as being easy to use, thus it might be argued that users rationalize their forced use of the system on the basis that it is easy to use in order to avoid cognitive dissonance. On the other hand, the original TAM with the attitude construct revealed a different pattern of relationships; PU was a significant predictor of attitude while neither PU nor attitude predicted behavioral intentions. The authors argue that in mandatory settings PU might better serve the goal of creating positive attitudes toward use rather than directly influencing intentions to use. Furthermore, the insignificant relationship between attitude and behavioral intention suggest that users' attitude toward using the system are not affecting their intentions to continue their use. Thus even though users might have negative feelings toward using the system they plan on continuing to use the system simply because they have to and they don't plan on leaving the organization. The results of the third tested model in the study, the TPB, confirm the aforementioned arguments; SN and PBC dominated the explanatory model and explained 52% of behavioral intention's variance.

In mandated environments attitudes might not align with actual behavior, that is, an employee might hold a negative attitude toward adopting the new system, but will ultimately use the system because he/she has to and no other options exist. Brown et al (2002) argue that this discrepancy between the attitude and the actual behavior constitute to an increased dissonance which might lead to undesired consequences. They further suggest that negative attitudes might lead users to question the motives behind the introduction of the new technology which in turn can lead to the surfacing of other hindrances to the implementation process.

A classic example that supports such view is the Markus (1983) study about the political perspective in explaining resistance. In that study Markus found that resisters interpreted the introduction of the new system as a political maneuver to alter the power structure within the organization. Recently, Chae and Poole (2005) adopted a structuration perspective (Giddens, 1984) in investigating the mandated adoption of enterprise technologies. They found that, over time, social construction of the mandate evolves from “differing” interpretations of the mandate. Those interpretations are influenced by both technical (e.g. IT infrastructure) and organizational factors (e.g. culture and the power structure). Furthermore, interpretations of the mandate reflect the interests of those parties involved in the implementation process. Jian (2007) draws upon a social constructionist perspective of technology and a tension centered approach to organizational analysis in an effort to understand what kind of tensions

materialize during the process of innovation adoption. By doing so, Jian (2007) attempts to highlight how those tensions affect the interpretations of the innovation, and how organizational members react to the adoption process in the presence of interpretations that were shaped and affected by the organizational tensions. The introduction of an innovation might bring to the surface organizational tensions which then serve as a lens through which potential adopters view and interpret the technology and the intentions behind introducing it, thus resulting in resistance behaviors.

To summarize, the attitude-behavior discrepancy in mandated use settings is not something to be ignored or overlooked. The implication of this view stems from the possibility that the adoption by users might be more related to rewards, punishments, and how closely their behaviors can be monitored, rather than beliefs about the usefulness of the technology (Brown et al., 2002). As such, the fact that the technology acceptance literature ignored and in many times overlooked the attitude construct doesn't mean that it is less relevant or unimportant. Negative attitudes toward using innovations and new technologies by end users might affect other work-related outcomes; as such, the "reintroduction" of attitude to technology acceptance models is a worthwhile endeavor.

Technology Acceptance: What has been said about leadership?

Leadership is one of the most studied topics in organizations, however, not enough literature exists on the issue of leadership in the IS discipline as it relates to technology acceptance. Within the IS literature, and specifically within the TA literature the issue of leadership per se has not been addressed directly, however, the issue of top management support and commitment has been studied extensively. An exception is an effort by Neufeld et al (2007) in which they integrate the UTAUT with charismatic leadership theory. Specifically, the study finds significant support for the relationship between perceived charismatic leadership behaviors of project champions and the antecedents of behavioral intention and usage behavior.

Agarwal (2000) points to the fact that management support and commitment has received consistent attention from researchers. By identifying twenty four studies that looked at and studied management support Neufeld et al (2007) argue that even with all the diverse and inconsistent conceptual definitions, weak measures, and insufficient theorization one can definitely make the case that top management support is highly associated with desirable outcomes such as use, success, performance effectiveness, and acceptance. In a review of the IT innovation adoption research, Jeyaraj et al (2006) report that top management support was one of the best predictors of individual IT adoption along with computer experience, perceived usefulness, behavioral intention, and user support.

Top management commitment and support has been conceptualized and measured in several ways which reflect the dispensing of support messages and signals, leading by example, and making sure that resources needed to ensure the success of the implementation are available (Agarwal, 2000). Within the ERP implementation literature, top management support has been repeatedly listed as one of the most critical success factors for ERP implementation efforts (Nah et al., 2001; Aladwani, 2001; Akkermans & Van Helden, 2002). It has also been argued that the lack of support signals from top management may reduce the chances of a successful implementation (Yetton et al., 1999).

In a qualitative study, Gallivan (2001) finds that clear and strong signals of top management support facilitated all stages of innovation assimilation. In the same study Gallivan argues that even though top management support might be highly related to the committing of resources to facilitate the implementation process, the two factors should be looked at separately because top management support doesn't necessarily mean that resources will be made available. Other research further argues, based on the finding that top management commitment and support influenced ease of use perceptions, that users attribute the availability of resources and support to top management commitment; so in a way, top management commitment can be viewed as a factor that helps users overcome obstacles which might arise during the implementation (Igbaria et al., 1997; Lewis et al., 2003).

Even with the extensive research which linked management support to positive outcomes, there seems to be a paucity of research aimed at exploring how such support affects specific constructs that are relevant to individuals' acceptance of a technology (Lewis et al., 2003). Most studies that looked at the issue of management support were mainly concerned with top management support. What is missing however is a deeper understanding of how such support influences specific beliefs and attitudes of prospective end users within organizations. To our knowledge few studies attempted to address this limitation. For example, Igbaria et al (1995) reports that management support influenced PU and perceived usage. In a later study, Igbaria et al (1997) finds that management support influenced PU and PEOU directly and usage indirectly. Along the same lines, Lewis et al (2003) finds significant support for the relationship between top management support and PU and PEOU. Speier and Venkatesh (2002) also report a significant relationship between management support and the constructs of image and visibility.

Worth mentioning here is a study, which was longitudinal in nature, that found a different pattern of relationships between top management commitment and users' attitudes toward using the technology that was being introduced. Specifically, the study found that top management commitment has no significant effect on users' attitudes at time-1 and had a significant negative effect on attitudes at time-2 when users had some direct experience with the system. The authors argue that this might be a result of an unrealistic representation by top management about what the system would be like and what it would do (Ward et

al., 2005). Interestingly in the same study, the authors also looked at the relationship between managers' influence and users' attitudes and found that the former has a significant negative impact on the latter. However, looking at the scale items used to measure the management influence shows that two items were used, one capturing the direct supervisor influence and the other capturing top management influence. By the same token, items designed to measure top management commitment doesn't seem to match what the construct means, thus, in a way it reinforces what Neufeld et al. (2007) suggest with regards to the lack of consistent theoretical and conceptual foundations. One can further argue that even with those studies that attempted to study the effects of top management support and/or commitment on specific technology acceptance beliefs and constructs, there is still a lack of emphasis on the complexity of the leadership processes at different organizational levels (Sharma & Yetton, 2003).

The inconsistency and confusion that exists becomes even more obvious when the distinction between top management support and "local" management support is blurred. That is, when ,for example, management support, top management commitment, management influence all seem to refer to the same underlying construct, yet we don't know what they are attempting to measure, in many cases, due to the absence of measurement items that were used in the studies (Sharma & Yetton, 2003). What is even more problematic is the lack of a clear definition with regards to top management support. Is it leadership? Is it the resources allocated? Is it the messages that employees hear? Is it the visibility of

such support? An exception to the blurring issue is the study by Lewis et al (2003) in which they introduced top management commitment and local management commitment as two distinct constructs with differing influences on users' beliefs.

A missing piece from the leadership puzzle as it relates to technology acceptance is an exploration of how top management support gets translated in the organizational hierarchy, and how it manifests its effects on users at different levels within the organization. Agarwal (2000) argues that, if not addressed at the appropriate level within an organization, management support may not be as valuable as it could be. That is, it doesn't allow us to pay sufficient attention to what actually happens as the management support filters down the organizational hierarchy.

Supporting this premise, Leonard-Barton (1987) argues that one's immediate supervisor is central to how he/she responds to organizational influences such as top management support. Kozlowski and Doherty (1989) argue that because supervisors are the most salient representatives of management actions, policies, and procedures, subordinates tend to generalize their perceptions of supervisors to their organization at large. Furthermore, Rice and Ayden (1991) suggest that one's supervisor is a primary resource of information during technology implementation. Also, building on previous literature, Zmud (1984) finds additional support for the argument that management's attitude exerts the strongest influence on users' use of process innovations. Additionally, Lewis et al

(2003) argue that management commitment pass through the multiple levels that exist within the organization. They further argue that employees' behaviors and beliefs are affected by messages they receive and perceive from both the top management and their direct supervisor. As such, they suggest that studies which introduce management support as a variable in their explanatory models should consider the fact that support occurs at multiple levels. Before Lewis et al. (2003) Fichman (1992) said that "*The net result is that studies of individual adoption within organizational settings must either incorporate managerial influences into the analysis or rule them out as a potentially confounding factor.*" (p. 4)

Recently, Venkatesh and Bala (2008) called for more research aimed at developing a "*richer conceptualization of management support to enhance our understanding of its role in IT adoption contexts.*" (pp. 297). They suggest using LMX (Leader Member Exchange) theory to understand how management influences the adoption of information technologies in organizations. The role of direct supervisors in influencing the beliefs and attitudes of employees has been addressed in the literature. For example, it has been argued that the influence of management support on employees' attitudes and behaviors will be indirect and subjective in nature, that is, how an employee interprets and perceives what he/she observes with regards to top management behaviors and attitudes toward a technology implementation effort will be dependent on more ambiguous evidence than, say, messages he/she receives from his/her direct supervisor (Leonard-Barton & Deschamps, 1988).

Given the aforementioned limitations and the gaps that exist in the literature, this research attempts to fill some of those gaps by integrating relevant constructs and findings from other disciplines, specifically from the technology acceptance, innovation implementation, change management, and leadership literatures.

CHAPTER 3

THE RESEARCH MODEL

Theoretical Foundations and a graphical representation

The research model builds on the theory of planned behavior (TPB) by borrowing variables from relevant literatures. The theory is an extension of the theory of reasoned action (TRA) and was initially introduced to overcome some of the shortcomings of its predecessor.

As the name suggests, the theory of reasoned action is based on the premise that humans are rational beings who make use of available information (Ajzen & Fishbein, 1980). As rational actors, humans consider the implications of their behaviors before they decide on engaging (or not) in behaviors. The theory's ultimate goal is to not only predict but also *understand* human behavior. Another important assumption, which was later described as a limitation and led to the development of the later theory of planned behavior, is that for the theory to best predict behavior, the behavior of interest has to be under *volitional* control. The Theory of Reasoned Action makes the assumption that a person's intention to perform (or not perform) a behavior is the immediate and direct antecedent of behavioral performance. Within the theory, behavioral intention is aimed at capturing the motivational aspects that will ultimately influence the behavior. Under circumstances of volitional control the theory argues that the stronger a person's intention to perform a behavior the more likely he/she will do so.

As the model in figure-3 suggests, behavioral intention is a function of two main determinants: Attitude *toward the behavior* and subjective norm. The attitude construct is aimed at capturing the person's positive or negative evaluations toward performing the behavior. While Subjective Norm captures the social influence aspects as they relate to behavioral performance. In other words, subjective norm evaluations reflect the person's perceptions about how relevant others might approve or disapprove the performance of the behavior. It is worth mentioning here that the relative importance of attitude and subjective norm in explaining and predicting behavior will largely depend on the behavior of interest and the situational factors.

For the purpose of better understanding behaviors on a level deeper than just evaluating attitudes and subjective norm, the TRA introduces behavioral and normative beliefs to help explain why people hold specific attitudes and subjective norm evaluations. Specifically, the TRA postulates that attitude is a function of behavioral beliefs, that is, the beliefs which link the behavior to certain outcomes or some other attributes.

According to the expectancy-value model (Fishbein & Ajzen, 1975) a person's attitude is directly proportional to the summative belief index $\sum b_i e_i$ where (b) is the strength of each salient belief and (e) is the subjective evaluation of the belief's outcome. By the same token subjective norm is a function of normative beliefs about whether important referent individuals or groups approve

or disapprove of the person's performing (or not performing) the behavior of interest. Within the TRA normative beliefs' summative index $\sum n_i m_i$ (where (n) is the normative beliefs and (m) is the motivation to comply with the referent in question) is directly proportional to subjective norm. In TRA both behavioral beliefs and normative beliefs are elicited anew for each context.

The Theory of Reasoned action makes it clear that it is aimed at explaining and predicting behavior, thus the theory argues that attitudes toward objects, whether those are machines, people or institutions, are not central to the theory. More importantly, they add little to the prediction and explanation of intentions and behaviors. An example should make this clearer. Let's say that an individual have a positive attitude toward a bike that he/she purchased a while ago, this doesn't mean that he/she will actually ride it as he/she intended when the bike was *initially* bought. The theory suggests that his/her attitude *toward using* the bike will be better predictor of actually using it.

Additionally, the theory argues that other factors such as gender, age, and personality traits –even though they might have an effect on behavior- are not central to the theory and are considered to be external variables. The influence of such variables, the theory suggests, will be mediated by the main variables which constitute the theory. To digest this, one has to keep in mind that the TRA in its original form is not aimed at predicting behavior in specific situations by introducing what the theory terms as external variables, but rather to provide a

general theory which can explain and predict a *specific behavior* by eliciting *beliefs* from the targeted audience we are interested in.

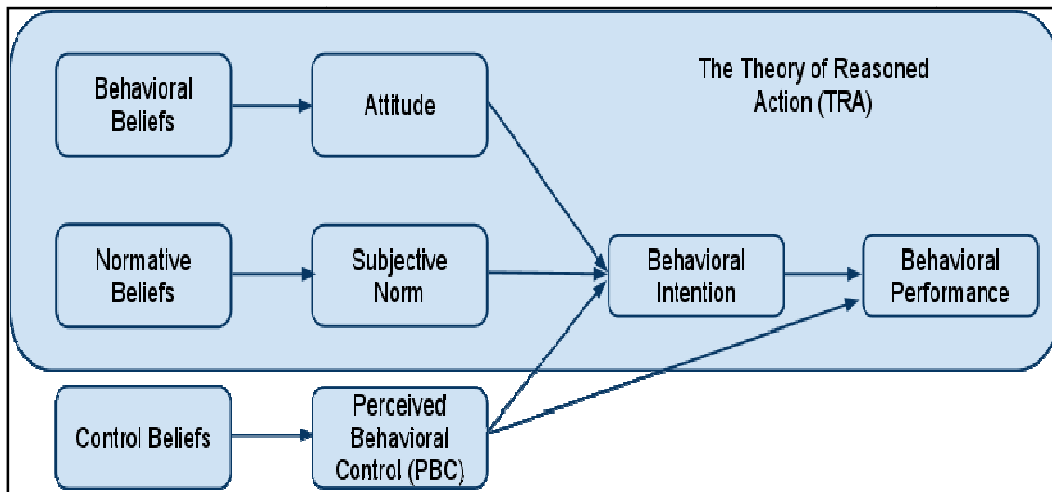


Figure 3: The Theory of Planned Behavior (TPB) and the Theory of Reasoned Action (TRA)

The TRA's predictive and explanatory power is limited to behaviors that are mainly volitional (Ajzen, 1980). This assumption limits the number of behaviors that the theory could be applied to. In the TRA intention, which represents the motivational aspects of the behavior, is deemed the most important antecedent of behavioral performance. Control over performing the behavior didn't receive its appropriate and theoretically deserved attention. As such, in response to criticisms and in effort to address the shortcomings of the TRA, the theory of planned behavior was introduced (Ajzen, 1985; 1991). By adding the construct of Perceived Behavioral Control (PBC), the TPB allows researchers to account for almost any behavior. PBC refers to “*people’s perceptions of the ease or difficulty of performing the behavior of interest.*” (Ajzen, 1991: p.183).

Similar to the TRA treatment of attitude and subjective norm, the TPB postulates that control beliefs are the main determinants of PBC. Control beliefs are aimed at representing the way actors perceive the existence of factors that might facilitate or hinder their behavioral performance (Ajzen, 1991). Furthermore, PBC was postulated to be an antecedent of both behavioral intention and behavioral performance. The influence of PBC on intentions is based on the premise that high levels of PBC “...*should strengthen a person's intention to perform the behavior, and increase effort and perseverance.*” (Ajzen, 2002).

Within the discipline of social psychology, where the theory originates, the theory of planned behavior has received consistent support, with many of its hypothesized relationships being supported (Armitage & Conner, 1999; 2001). In their meta-analysis of the TPB, Armitage and Conner (2001) reported that the theory was able to account for thirty nine and twenty seven percent of the variance in intentions and behavioral performance respectively. Further support was found for the utility of adding PBC, where it accounted for significant increases in the prediction of both intentions and behavioral performance.

The earlier discussion of the TRA applies to the theory of planned behavior. As figure three shows, the theory of reasoned action can be considered a special case of the more encompassing and general TPB. The TPB has been utilized by many IS researchers mainly to study users' acceptance of technology (e.g. Mathieson, 1991; Taylor & Todd, 1995; Brown et al., 2002; Venkatesh et al.,

2003; Luarn & Lin,2005; Thompson et al., 2006). Taylor and Todd (1995) introduced a decomposed theory of planned behavior (DTPB) where they, as the name suggests, decomposed behavioral, normative, and the control beliefs into beliefs constructs that can be applied across multiple technologies and situations. The decomposed model displayed better explanatory and predictive power than both the TAM and the TPB. Even though it is less parsimonious than TAM, the DTPB draws a richer and more colorful picture of the acceptance phenomenon; by providing deeper insights, the DTPB can be of more value to practitioners.

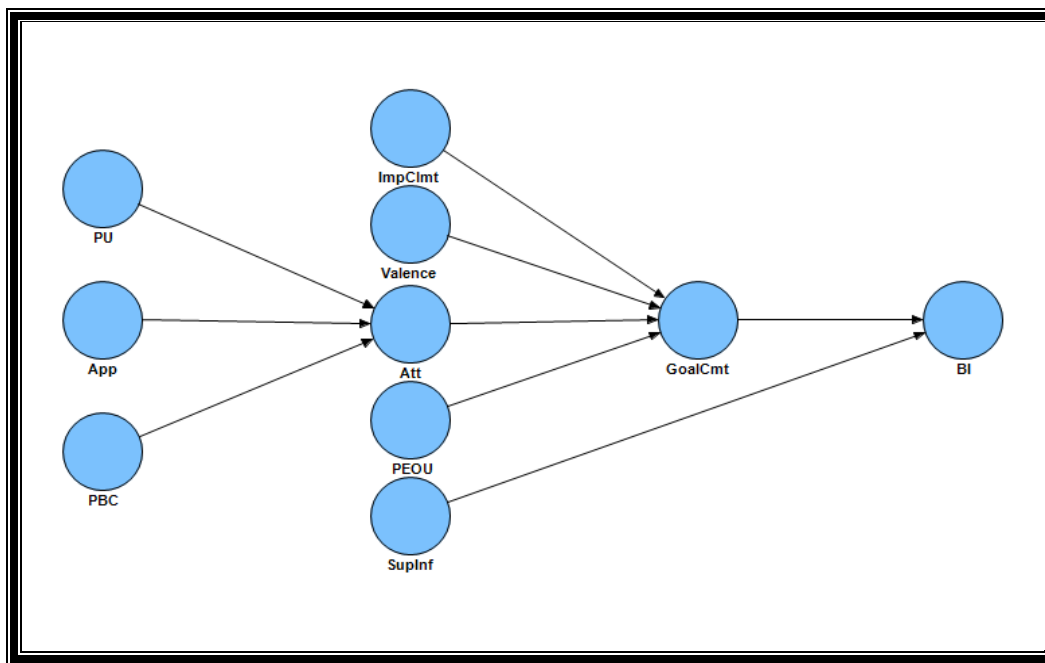


Figure 4: The proposed research model (Note: LMX and its moderating roles aren't shown to reduce clutter)

It is rather imperative after introducing the research model and its theoretical foundation that the relevant literatures from which the model was constructed are explored in a deeper fashion. What follows is a review of those literatures as they relate what the research attempts to achieve.

Innovation Implementation:

The challenge of innovation implementation is understandable. Klein and Knight (2005) introduced what the literature characterized as the prominent reasons on why it is difficult to implement innovations in organizations. Those reasons can be summarized as: Technical issues as they relate to the innovation's reliability and usefulness ;complexity as it relates to the need to learn new knowledge and skills; the disruption in the sense of certainty; the consequences of using the innovation on established roles, routines and norms -especially when adoption decisions are made by senior management.

The issue of innovation implementation has been increasingly receiving attention in both academia and the business world where organizations look for new ways to do things and develop new systems. Klein and Sorra (1996) point to the fact that even though a lot of research has been done in the general area of innovation, little research looked at the issue of innovation implementation. Innovation implementation is defined as "*the process of gaining targeted employees' appropriate and committed use of an innovation*" (Klein & Sorra, 1996:p.1055). From a temporal perspective, implementation follows the adoption decision and it represents "*the transition period during which targeted organizational members become increasingly skillful, consistent, and committed in their use of an innovation.*"(p.1057)

As new technologies, processes, procedures, and systems infiltrate the world of organizations, research on potential adopters' acceptance of those innovations received and is still receiving attention from professionals as well as academic researchers. Developers of new technologies, senior management, and those who are responsible for managing the changes associated with the implementation of innovations are realizing that the lack of user acceptance can - and most probably will- lead to loss of money and resources as well as affecting the organization's bottom line. This led many organizational analysts to reach the conclusion that implementation failures are the main reason why many change efforts fail to achieve the intended benefits of the innovation. (e.g. Klein & Sorra, 1996; Klein & Knight, 2005).

Damanpour (1991) defines innovation as the process of adopting a new device, system, policy, program, process, product, or service. The novelty of the innovation is to be considered from the perspective of the adopting entity. This is consistent with the view of many scholars including Rogers (2003) who defines innovation as "*an idea, practice, or object that is perceived as new by an individual or other unit of adoption*" (P. 11) . For Rogers, an idea is new if it is perceived to be new by the potential adopter. Klein and Sorra (1996) identified two approaches for describing innovations. Namely, the source-based model adopts the perspective of the innovator. In this model, an innovation is "a new product or service that an organization, developer, or inventor has created for market." (P. 1057). On the other hand, the user-based model adopts the

perspective of the user which is similar to Roger's definition. The latter view is the one adopted in this paper.

The literature also distinguishes between the adoption and the diffusion of an innovation. Adoption refers to the decision to use an innovation, while diffusion deals with the accumulated levels of users of the innovation. Rogers (2003) defines diffusion as "*the process by which an innovation is communicated through certain channels over time among the members of a social system*". (P. 10). The literature has also differentiated between adoption decisions which occur at the organizational level and decisions that occur *within* the organization.

Many-if not most- innovation adoption decisions in organizations are usually made by the organization's senior management. Those initial adoption decisions, which represent an organizational level adoption, are built upon the premise that employees will ultimately use the innovation. But reality makes it clear that successful implementation requires committed usage by the organizational members who are the target of the innovation implementation effort, thus when employees don't change their behavior and/or limit their usage of the system or the process, the change is not institutionalized and the question of "why did we fail" arises. Klein and Sorra (1996) highlighted that implementation failures are becoming the main reason why many organizations don't reap the anticipated benefits of the innovation.

Rogers (2003) proposes three types of innovation decisions: Optional, collective, and authority decisions. This research is mainly concerned with the authority decisions type where the decision to adopt or reject an innovation is made by senior management and where organizational members have little choice but to comply. As such, the term “contingent innovation decisions” was introduced. It refers to the situation where prospective adopters’ adoption of an innovation is contingent upon a decision made by a higher authority (Zaltman et al., 1973; Rogers 2003). Thus, the innovation adoption decisions within organizations can be viewed as a two-step process where a primary decision is made by those at the top which is then followed by an implementation effort where secondary adoption decisions are made by the targeted organizational members (Zaltman et al., 1973). Leonard-Barton and Deschamps (1988) referred to such process as “internal diffusion” whereas Frambach and Schillewaert (2002) called it “Intra-organizational acceptance”. The following figure adapted from Gallivan (2001) is a graphical representation of the process of contingent authority innovation adoption within organizations. (pp. 53)

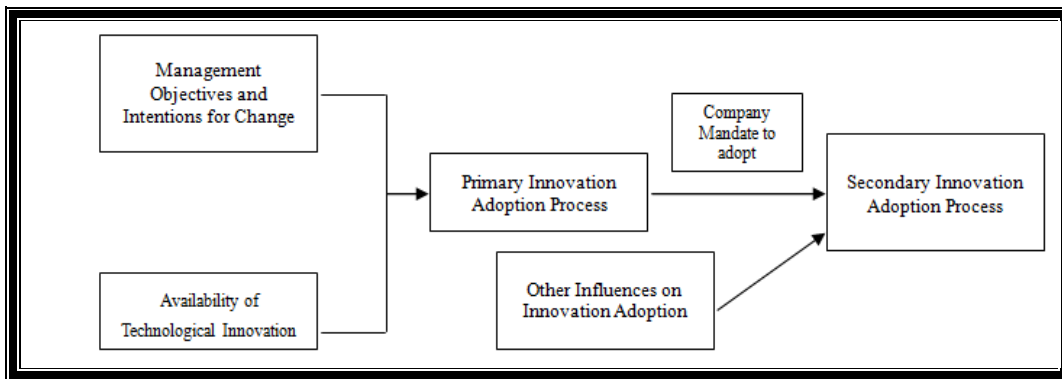


Figure 5: Contingent Authority Adoption within organizations (Gallivan 2001)

Discussing the time dimension of the diffusion process, Rogers (2003) conceptualizes the innovation decision process as a one in which the decision making entity navigates from first knowing about the existence of the innovation, to forming an attitude toward it, to the part where it has to make the decision whether to adopt or reject the innovation, to its implementation and use, and finally to the confirmation of the adoption decision. Respectively, those steps are referred to as: Knowledge, Persuasion, Decision, implementation, and confirmation. Within the IS literature the stage model advanced by Kwon and Zmud (1987) introduces a similar conceptualization to that of Rogers. The labels assigned to each stage might be different but the underlying logic remains the same. Specifically, Cooper and Zmud (1990) introduce the following IT implementation process which encompasses the following stages (pp. 124):

- Initiation: A stage during which a matching process between a need and a technology takes place.
- Adoption: The stage where the decision is made to invest in a technology. This stage involves the process of internal and external negotiations with regard to the choice to be made.
- Adaptation: The technology is put into place and organizational members are trained.
- Acceptance: End users are induced to commit to using the system. The “go live” stage.
- Routinization: Attempting to make usage of the system the new norm.

- Infusion: Which refers to the stage where the implementation is effective and yields desired outcomes (i.e. Successful).

Looking beyond the labels given to each stage by either Rogers (2003) or Cooper and Zmud (1990), this research is aimed at studying the pre-implementation stage during which initial attitudes toward using the technology are formed. In the context of this research pre-implementation is synonymous with pre-deployment; that is the period before the new system has been rolled out and put to use.

Frambach and Schillewaert (2002) introduce a conceptual framework for organizational innovation adoption. The framework integrates findings from multiple disciplines and provides an overall picture as to what leads to innovation adoption by organizations. Central to the adoption process is the concept of innovation characteristics. Rogers (2003) focuses on innovation characteristics as *perceived* by individuals. The perception part is of great importance since potential adopters' focus is usually not on the objective characteristics of the innovation but rather on how they perceive it. Furthermore, what might be viewed objectively as being useful for one individual might be viewed otherwise by another.

Reviewing numerous innovation studies Rogers reaches the conclusion that there are five main innovation characteristics that influence the adoption

process: Relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the perception that an innovation is better than its predecessor while compatibility refers to the perception that the innovation is in harmony with existing “*values, past experiences, and needs of potential adopters*” (Rogers, 2003:p.15). Complexity is about the perception of the difficulty and cumbersomeness of using the innovation. Trialability deals with the perception that an adopter can experiment with the innovation. And finally, observability is the perception of the degree to which the results of using an innovation is visible to others.

Frambach and Schillewaert (2002) introduce a generalized framework for individual acceptance of innovation which is rooted in multiple disciplines. The model, they argue, is not aimed at representing a static picture of the acceptance phenomenon, but is rather aimed at providing a simplified representation which can and should be adapted to *match* the situation under study. Central to the framework is the *attitude* construct which is represented here as encompassing both beliefs and affect. Beliefs here might represent Rogers innovation characteristics or for that matter any beliefs that are relevant to the innovation of interest. Personal dispositional innovativeness refers to the degree to which an individual adopts an innovation regardless of others’ experiences.

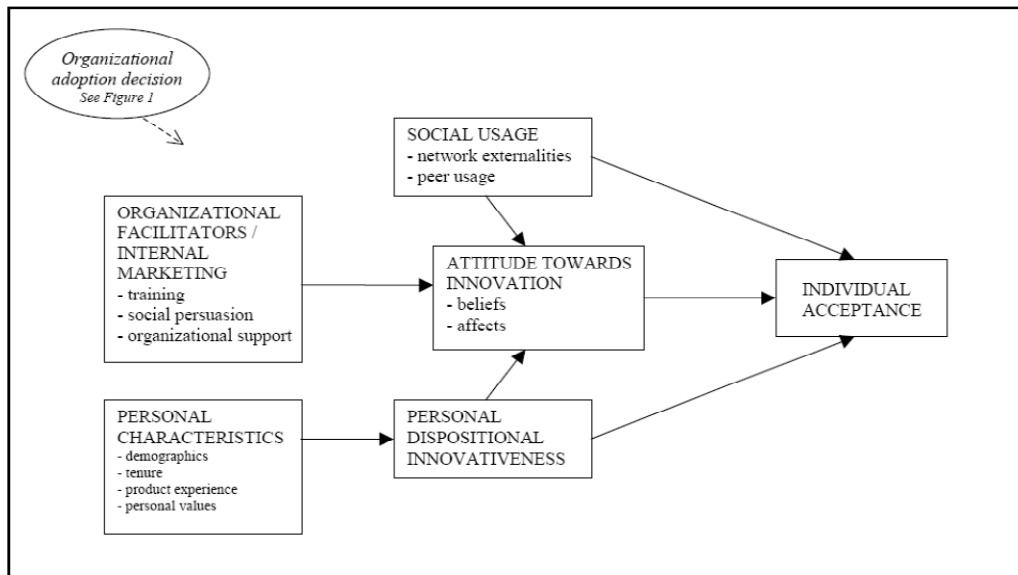


Figure 6: A conceptual Framework of individual innovation acceptance in organizations (Frambach & Schillewaert, 2002: pp. 167).

Decisions to adopt an innovation are not usually based on objective evaluations of the innovation and the consequences of its use, rather, individuals and organizations rely on subjective evaluations (Rogers, 2003). Those subjective evaluations occur in the context of social interaction where communication and socialization are central. As such the discussion of social influence as it relates to innovation implementation represents another area that is relevant to this research.

Innovations and social influence:

In organizations social influence plays an important role especially when a behavior is not volitional; top management, direct supervisors, and peers do have influence in organizational settings. Johanson (2000) reported that communication with other employees is more relevant for one's interpretation of external reality than his/her self-perceptions. Social influence is manifested through the shared

experiences, observations, and discussions which occur within the organization throughout the implementation process. Rogers's definition of diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003: p. 10) reflects the integral role of social systems and the communication that occurs within those systems in the diffusion process.

Within the workplace environment the acceptance of the innovation by those who are socially relevant to an individual carries signals that might persuade him/her to consider adopting the innovation (Frambach and Schillewaert (2002). Within the social psychology literature social influence is captured by the perceptions that important others think an individual should or should not behave in a certain way (i.e. Subjective Norm and normative beliefs) (Fishbein & Ajzen, 1975). Additionally, the social psychology literature emphasizes the centrality of beliefs and attitudes in guiding behavior. Thus, the management's role in the diffusion process can be viewed as a marketing endeavor aimed at "selling" the innovation to organizational members. This marketing effort is essentially a social process which involves individuals with differing backgrounds, interests, and capabilities, as such; any change message targeted toward those who might be affected by the innovation will be shaped by its social interpretation (Armenakis et. al., 1993).

Rogers Innovation diffusion theory conceptualizes the innovation decision process as information intensive one during which the decision making entity

seeks, integrates, and interprets information that is available in its social surrounding. Uncertainty reduction is central to the theory. Rogers (2003) argues that at the knowledge stage, individuals seek information about how and why the innovation works, while at the persuasion stage during which attitudes are formed, the information seeking behavior becomes more personally relevant in nature, that is, individuals become more concerned about how the innovation will affect them personally and what the consequences of its use are. However, the innovation diffusion theory postulates that the innovation decision process has a binary outcome of either adoption or rejection. One might argue that in voluntary situations this might hold true, but in mandatory setting the decision process is a more complex one. For example, Burt (1987) argues that adopting an innovation is risky, in the sense that there is uncertainty with regards to the costs vs. benefits that might result from adopting and then using the innovation. He further argues that people deal with this type of uncertainty through a process during which they search for an acceptable social interpretation of the risks associated with the adoption process.

From social information processing perspective, beliefs and attitudes with regards to the innovation and its consequences become the focus (Salancik & Pfeffer, 1978). Those beliefs and attitudes will either be positive and facilitate the diffusion process or might be negative and hinder the process. For example, Weenig (1999) found that formal communication sources are more important than informal ones in diffusing the information about the innovation. One the other

hand, informal communication with one's "strong ties" is more influential with regards to attitudes and intentions to adopt.

Building on the mass communication literature Armenakis et al. (1993) argue for multiple theories on how social influence could operate in the early stages of innovation implementations. They caution that individuals are different in their cognitive structures, thus they might interpret messages and cues differently. This view is consistent with Rogers's arguments about homophily (i.e. the degree to which interacting individuals are similar in certain attributes) and heterophily and their effects on communication effectiveness (Rogers, 2003). Furthermore, social differentiation theory suggests that one's cultural and sub-cultural identification affects how he/she responds to the innovation implementation process. For example, Innovation-values fit has been introduced to capture the degree to which prospective users perceive that the innovation and its use are consistent with their existing shared values (Klein & Sorra, 1996). The shared nature of values amplifies their effects on users' beliefs, attitudes, and ultimately their behavioral responses. Additionally, social relationships theory suggests one's network of relationships is central to his/her potential responses, specifically what Rogers (2003) termed as opinion leadership (i.e. a person's informal influence abilities on other's beliefs and attitudes).

Implementation Climate:

As mentioned earlier, innovation adoption differs from diffusion, and organizational adoption decisions are of no value if the targeted users within the organizations do not commit to using the innovation. Using an innovation implies a change in behavior on the part of prospective users. The effectiveness of the innovation implementation process is dependent upon what Klein and Sorra (1996) termed as the implementation climate and the innovation-value fit. An implementation climate refers to “*employees’ shared summary perceptions of the extent to which their use of a specific innovation is rewarded, supported, and expected within their organization.*” (p. 1060). The support and expectation aspects of the climate reflect the importance of social influence in the diffusion process while the reward aspect is more personal in nature. Klein and Sorra (1996) introduced the implementation climate as an organizational-level concept which is meant to capture the overall influence of the various policies and techniques used by organization during an implementation effort. The second determinant of implementation effectiveness is Innovation-values fit which “*describes the extent to which targeted users perceive that use of the innovation will foster (or, conversely, inhibit) the fulfillment of their values.*” (p. 1063). Innovation-values fit can be conceptualized at the organizational or group level.

Several researchers tested the innovation implementation model advanced by Klein and Sorra (1996). Klein et al (2001) tested parts of the model on 39 plants implementing MRP systems. Management support, financial resources

availability, implementation climate, and policies and practices were all significant predictors of implementation effectiveness. Holahan et al (2004) reports similar results to those originally found by Klein et al. (2001). Specifically, receptivity toward change is found to be a direct antecedent of implementation climate which in turn is a significant determinant of implementation effectiveness. Dong et al. (2008) tested the model -at the individual level- in ERP implementation environments and found support for all the hypothesized relationships. Specifically, implementation climate had a significant positive influence on the skills, incentives, and absence of obstacles variables. Also innovation-values fit is a significant determinant of the variable user affective commitment. Overall, the model explains 63% of the variance in implementation effectiveness. Along the same lines, Osei-Bryson et al (2008) developed and validated scales in the context or ERP implementation environment. They argue that the relationships in the model are much more complex than those originally postulated.

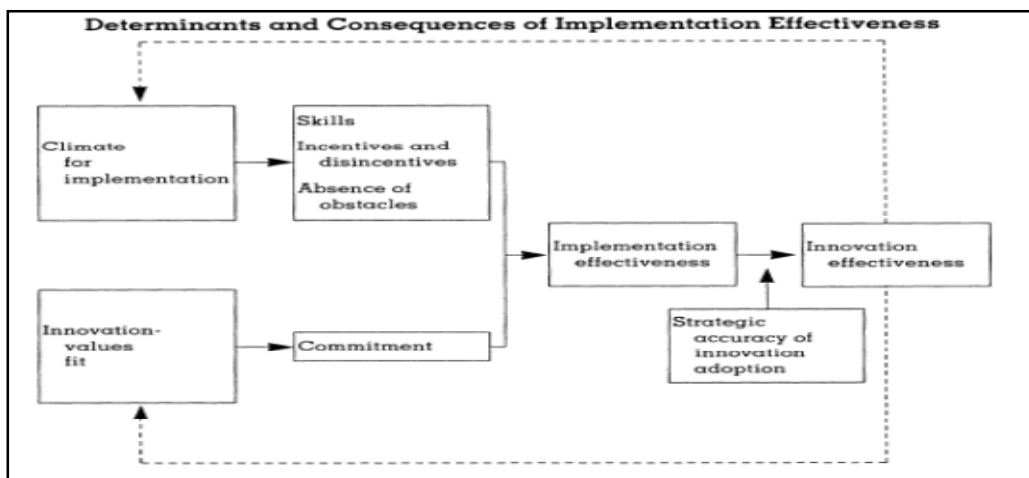


Figure 7: A model of innovation implementation (Klein & Sorra, 1996: p. 1056)

The model warrants further investigation of how management, specifically one's direct supervisor, affect implementation climate and how such climate is translated in the behaviors of end users. The uniqueness of implementation climate stems from the fact that it allows researchers to focus on the most relevant variables without spending too much time and resources trying to capture the complexities of the different policies and actions that take place during implementations.

Next is a review of change management literature as it relates to the goals of this research. Innovation and organizational change are two closely related concepts in the sense that innovations are means for changing organizations (Damanpour, 1991; Markus, 2004). Prominent IS researchers agree and subscribe to the idea that organizational change and information technologies are closely related, and as such has received researchers' attention from multiple disciplines (Markus & Robey, 1988). Lines (2005) points out to the agreement among many scholars that, when it comes to change efforts-such as the process of innovation implementation, success is dependent on organizational members' responses. The similarity of innovation adoption represented by an organizational information system to organizational change efforts warrants further integration of the two streams of research (Armenakis et al. 2007). Venkatesh and Davis (2000) argue that "*Understanding and creating the conditions under which information systems will be embraced by the human organization remains a high priority research issue*" (pp. 186). More recently, there have been calls for research efforts which

are to be focused on understanding and prescribing managerial interventions to enhance the outcomes of IT adoption projects within organization (Venkatesh & Bala, 2008).

Change management:

As this research attempts to look at the pre-implementation stage of adoption process, it is imperative that the focus is on issues which are relevant to that stage, namely, the formation of attitudes and the creation of readiness for change. Understanding the formation attitudes, especially in organizational settings is of great importance (Rice & Aydin, 1991). Fichman (2000) suggests that the timing and the way a targeted prospective adopter hears and learns about the innovation have major influence on adoption. This view is consistent with research which points out that first impressions, usually, have some bearing on the way we interpret later information (Tetlock, 1983). Additionally, attitude formation in change endeavors is critical since attitude change is often a great challenge. Lines (2005) points that attitude “perseverance” is mainly an outcome of the latter selective exposure to information, biased memory for encoded information, and active argumentation against attitude-inconsistent information. Costa et al (2003) argue that when viewed as a change agent, the manager’s role in the change effort can be viewed as one of aligning organizational members’ attitudes with organizational goals.

Change, in most forms, creates a sense of uncertainty and lost control, and employees' resistance represents one of the most cited causes for failures associated with change implementation efforts. This resistance represents a major barrier for changing the behaviors of organizational members to use the innovation and for the organization to reap its benefits.

When it comes to resistance, adopting a proactive approach is highly recommended and is consistent with the adaptive-responsive management approach (Armenakis et al., 1993). People tend to form attitudes early in the change process and those attitudes help them interpret their surroundings and the messages they receive. This attitude formation process resembles the well-known freezing stage of Lewin's model. The resemblance implies that once attitudes are formed, altering or changing them becomes more difficult, thus influence attempts are expected to be more effective when attitudes are not yet fully formed, that is, early in the project (Lines, 2005).

This suggests that more attention should be paid to activities dealing with the early phases of the innovation implementation process. Armenakis et al. (1993) termed this as "creating readiness for change". The readiness creation process is similar Lewin's concept of unfreezing. Armenakis et al. (1993) argue that readiness "*is reflected in organizational members' beliefs, attitudes, and intentions*" (pp.682). They further argue, based on existing literature, that readiness for change may increase the effectiveness of change efforts by reducing

the potential for resistance. Additionally, the role of management in influencing organizational members' readiness for change has been highlighted in the literature (e.g. Armenakis et al., 1993; Armenakis & Harris, 2002).

Change is inherently uncertain; as such communication in the innovation implementation process is very important due to its role in “managing” uncertainty (Rogers, 2003). The effectiveness of the communication efforts is dependent upon their ability to reflect and affect the beliefs of the communication recipients. Managerial messages that talk about profitability, bottom line, organizational performance, cost reduction, etc... are not reflective of employees concerns. Thus, for a communication to be effective it must take into account aspects that are actually relevant to the recipient. Lines (2005) argues that employees evaluate the change and form their attitudes based on the perceived consequences of the change on their job characteristics and their perceptions of the fairness of the implementation process. Such perceptions and beliefs represent the forces that will ultimately determine the reactions of change recipients.

Change recipients' beliefs:

By synthesizing research findings from both the change management and innovation diffusion literatures, Armenakis et al (2007) developed a model of change recipients' beliefs where they identify the five most dominant beliefs in the literature: Discrepancy, appropriateness, efficacy, principal support, and

valence. Discrepancy refers to the belief that there is a need for a change and that there is a gap between where an organization is and where it needs to be.

The innovation implementation literature points to the fact the innovations should fulfill a need (Rogers, 2003). Rogers's definition of compatibility specifically points to the importance of innovations meeting the needs of potential adopters. This suggests that compatibility perceptions presuppose that there was a "need" for which users strive to satisfy. Lines (2005) points to the importance of social accounts when it comes to communication that deals with the need for change. Daly and Geyer (1994) finds further support for arguments advanced by organizational change scholars with regards to the utility of justifying the change; by explaining why it was needed, employees affected by the change show more commitment to the change effort. Also, strong and clear messages of top management support have been found to be critical throughout the adoption process (e.g. Gallivan, 2001). Management messages usually carry cues of why the change is needed. Within the change management literature, the classical Coch and French (1948) study demonstrates the importance of creating readiness for change by showing employees that a change is critically needed. Armenakis et al (1993) suggest that arguments for discrepancy should be related to contextual factors and be able convey the message that there is a gap between where the organization is now and where it needs to be.

From an implementation perspective, Kotter (1995) advanced eight steps for managing change; the first step mainly deals with the creation of a sense of urgency by linking the organizational reality to the external environment. This sense of urgency establishes the need for change. By the same token, Galpin (1996), in his “wheel”, introduces the establishment of the need for change as the first critical step in the change process. By reviewing relevant literature Armenakis et al (2007) come to the conclusion that discrepancy represents one of the most important beliefs when it comes to the change management process. Based on their review, they developed an instrument that measures discrepancy beliefs among those who will be affected by the change, thus one can argue that potential adopters’ beliefs with regard to whether the new system is needed will have a direct effect on their attitude.

Appropriateness follows discrepancy in the sense that once a need has been recognized, one has to believe that the chosen course of action is appropriate. Rogers (2003) points that an innovation’s compatibility is usually assessed along three dimensions: Socio-cultural values and beliefs, previously introduced ideas, and the need for the innovation. Markus (2004) in the context of describing what she termed “Technochange misfits” suggests that a cultural misfit represents a critical obstacle to the success of a technochange effort. She defines misfits as the *“misalignments between a technology or a technochange solution and important dimensions of the organizational setting in which it is used.”* (pp.15). Along the same lines, Klien and Sorra (1996) introduce innovation-values

fit as a direct antecedent to employees' commitment to the innovation. For example, an innovation or a system that is built with efficiency in mind might not be fit with a culture that has long valued flexibility (Klien and Sorra, 1996).

Another belief which proved to be of significant importance is efficacy, which is rooted in the works of Albert Bandura, and refers to ones' belief in his/her capability of performing the new behaviors brought about by the change. While, principal support refers to the perceptions regarding the support for the change by management and the social system to which one belongs. And finally, valence refers to "*the attractiveness (from the change recipient's perspective) associated with the perceived outcome of the change.*" (pp. 488). Based on work motivation theory (Vroom, 1964) Armenakis et al. (2007) developed scale items that measure both extrinsic (e.g. incentives) and intrinsic (e.g. sense of accomplishment) valence (i.e. motivation). Valence will be discussed more thoroughly when its hypothesis is introduced later.

Within the change management literature, the role that social influence plays in the change process has also been highlighted by many researchers. For example, it has been argued that one's attitude is partially determined by the attitudes of those whom he/she interacts with (e.g. Rice and Aydin, 1991; Costa et al., 2003). Additionally, the role of leadership has been highlighted as a critical factor in any change effort (e.g. Armenakis et al, 1999) which leads this research to introduce the leader-member exchange theory (LMX).

The Leader-Member Exchange theory (LMX):

Leadership has been one of the most researched topics in the area of organizational research (Alvesson 1996, Yukl 2006). Historically speaking, the trait approach to leadership represents one of earliest approaches. The focus of this approach was on the traits of effective leaders, with the underlying premise that leaders are born, not made. Stogdill (1948) concluded that trait research hasn't displayed the usefulness of such approach. The behavioral approach to leadership came next as the study of leadership shifted from leaders' traits to leaders' behaviors. The underlying premise of this approach is that leaders' behaviors are more important than their physical, mental, and emotional traits (Yukl 2006). The behavioral approach view that some leadership behaviors are universally effective failed to acknowledge the existence of both situational and follower influences, thus new approaches emerged. Contingency or situational theories suggest that the organizational and/or work group situation will impact the degree to which a given leader's behavior will be effective (Yukl 2006). For the purpose of this research the focus is on one of leadership theories, namely, the Leader-Member Exchange (LMX) theory.

The uniqueness of Leader-member exchange theory stems from fact that it shifts the focus to the relationship between leaders and followers whereas prior theories' main focus was on leaders (Yukl 2006). The relationship based approach was first introduced by Graen and Cashman (1975) and Dansereau et al. (1975) as the Vertical Dyad Linkage Model (VDL). The basic premise of the VDL (and

LMX) is that different kinds of relationships develop between leaders and their subordinates (i.e. members.). Those relationships range from those based solely on formal employment contracts(i.e. Low LMX or out-group) to ones that are characterized by mutual trust, respect, and reciprocal influence(i.e. High LMX or in-group) (Dansereau et al. 1975; Liden et al. 1997; Liden & Maslyn 1998). One of the underlying theoretical premises of LMX is that dyadic relationships and the roles which evolve from such relationships are developed overtime through exchanges and interactions between the leader and the follower (Graen 1976). The speed at which those relationships develop was found to be quick. Furthermore, the relationship remains relatively stable after its formation (Graen & Cashman, 1975; Liden & Graen, 1980; Bauer & Green 1996).

LMX: How exchanges develop?

Dienesch and Liden (1986) proposed a model of the LMX developmental process. The “initial interaction” represents the first step in the LMX developmental process. Within this step both the leader and the member bring to the relationship their individual characteristics where an initial “cross evaluation” takes place. This two-way evaluation process is usually based on characteristics, attitudes, and role expectations. Such initial evaluations may also influence later aspects of the relationship. The second step involves the leader “delegating” to the member some task(s) which serve as test through which the leader can either confirm (or disconfirm) his/her initial evaluation. The third step in the process is the member’s response to the delegated or assigned tasks. The member’s response

represents his/her first contribution to the exchange process; this contribution is then interpreted and evaluated by the leader. The interpretation process is the fourth step in the model. It is also important to mention that the leader's interpretations can be subject to some sort of attribution biases and distortions.

In their review of LMX, Graen and Uhl-Bien (1995) describe how LMX evolved and departed from the VDL approach. They argue that since its inception, LMX research studied the development of the dyadic relationship between leaders and subordinates through the role making process, and it has been found that higher quality exchanges are consistently related to positive outcomes. The move beyond the description of the relation to study how the quality of the exchange relation develops and what outcomes those relations have on leaders, subordinates, and organization is what differentiated LMX from VDL. They further argue that effective leadership takes place through high quality social exchange processes. Graen and Uhl-Bien (1995) propose a leadership making model in an attempt to move the focus from the different dyadic relationships to the process of managing those relationships in a way that maximizes their effectiveness. The "lifecycle" of leadership making begins with a step similar to the previously mentioned model: the stranger phase. In this phase the leader-member interactions are formal and are based on organizational roles. The next phase involves either party making an offer for an improved relationship. Such offer is made through career-oriented social exchanges. This offer represents a transition "ticket" to the next phase in the relationship which is labeled as "the

acquaintance stage”. In this stage the social exchanges increase where work related and personal information are shared more frequently. The testing nature of the relationship is not over yet, but there is a fair return of favors. When those relationships evolve they move to the next and final level: Mature Partnership. This stage is marked by loyalty, support, trust, mutual respect, influence, obligation, and long term reciprocation.

The outcomes of LMX:

The issue of how differentiated LMX relationships are related to organizational outcomes has received considerable attention. High quality exchanges have been consistently related to positive organizational and individual outcomes. Graen and Uhl-Bien (1995), in their review of LMX studies, find consistent support for the outcomes of LMX such as: performance, turnover and turnover intentions, job satisfaction, organizational commitment, innovation, performance appraisal, job climate, organizational citizenship behaviors, and career progress. Additionally, in a meta-analytic review, Gerstner and Day (1997) report a positive relationship between LMX and each of performance, satisfaction with supervisor, overall satisfaction, commitment, role clarity, and member competence. They also found negative relationship between LMX and each of role conflict and turnover intentions among employees.

Studies of organizational commitment as an outcome variable of LMX quality have also shown a positive relation between the two (Duchon et al. 1986;

Kinicki & Vecchio 1994; Liden et al. 2000). Also, even though support was found for the distinctiveness of Perceived Organizational Support (POS) and LMX, they are related and influence one another; LMX appears to have a stronger effect on POS. This finding suggests that LMX plays a pivotal role in influencing employees' perceptions of organizational support because to them, their direct supervisor is the most salient agent for the organization (Wayne et al. 1997.) Moreover, many LMX studies have found a positive relationship between the quality of the exchange and job satisfaction. In high quality relationships, members receive preferable treatment which includes both formal and informal rewards, more open access to supervisors, support, and increased communication (Dienesch & Liden 1986; Graen & Scandura 1987; Scott & Bruce 1994; Wayne et al. 1997). This suggests that those employees should have higher job satisfaction. This premise has been supported consistently in many studies, thus suggesting a positive relationship between the LMX quality and job satisfaction (Campbell et al. 2003; Erdogan & Enders 2007; Graen et al. 1982; Liden & Graen 1980; Major et al. 1995; Michael et al. 2005; Mueller & Lee 2002; Schriesheim et al. 1998; Vecchio et al. 1986).

For this research, the relevance of such findings and the other ones which will be discussed when the hypotheses are introduced stems from the fact that direct supervisors and managers represent the closest organizational representatives, and that their actions might have some influence on how

prospective end-users will react to the introduction of the new system or technology.

Research Questions and the Hypotheses:

The General Research question:

Will the introduction of a richer model for technology acceptance in a mandatory adoption environment, specifically in the pre-implementation phase, allow us to capture and account for the complexities of organizational technology implementations?

The model's theoretical foundation comes from the Theory of Planned Behavior (TPB) (Ajzen, 1991). A minor departure from the TPB and the existing acceptance literature is the absence of an explicit inclusion of subjective norm, however, the construct of implementation climate along with supervisor influence are theorized to capture the social influence aspects within the acceptance process. Furthermore, the model introduces the variable of "Goal commitment" in an effort to overcome the non-significant and inconsistent relationship between attitude and behavioral intention in mandatory adoption contexts (Brown et al., 2002). Rogers (2003) refers to such situations as ones characterized by "innovation dissonance". Goal commitment is similar to the concept of symbolic adoption (Karahanna, 1997; 1999) and is theorized to have direct and indirect effects on other behaviors and attitudes beyond behavioral intention-to-use and usage behaviors.

Additionally, by introducing LMX as a moderating variable, this research is mainly focused at exploring the role that the employees' supervisor has in affecting the employees' direct beliefs, attitudes, and ultimately their behaviors.

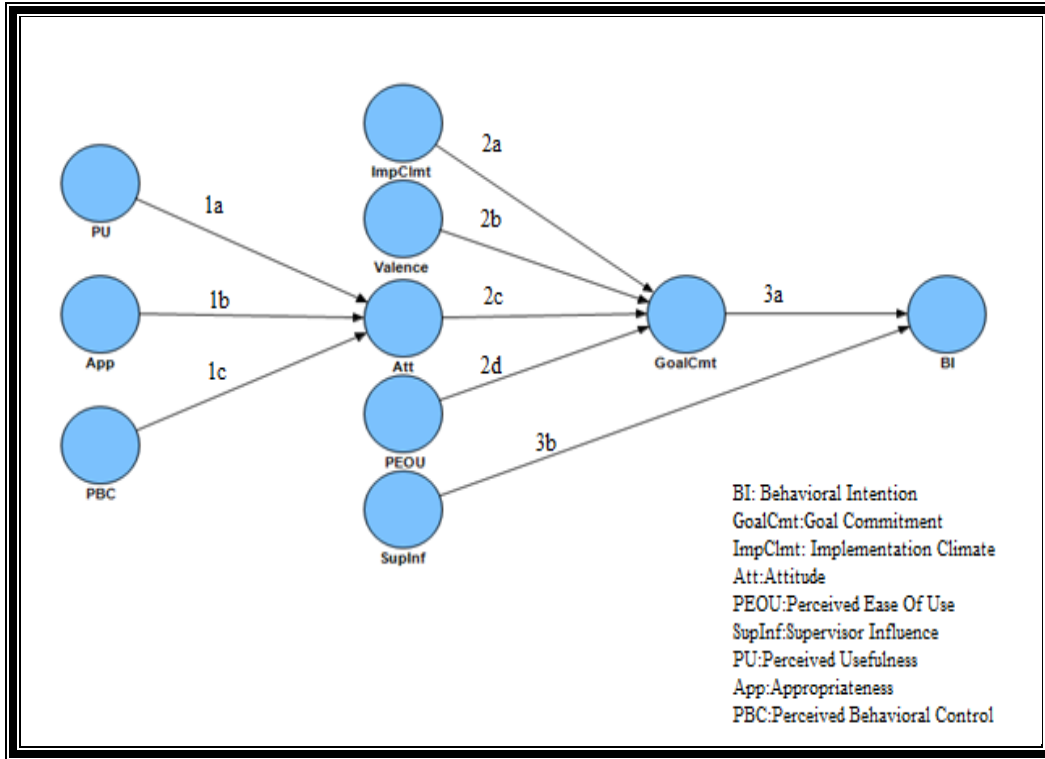


Figure 8: The proposed research model (Note: LMX and its moderating role is not shown to reduce clutter)

Research Question 1:

In a mandatory adoption environment, and specifically in the pre-implementation phase, what are the variables that are expected to influence and explain employees' Attitudes toward adopting and using the system upon its rollout?

Perceived Usefulness:

One of the TAM's central premises is the instrumentality assumption. Specifically, the TAM was built on the premise that the underlying mechanism by which the model's main variables are said to operate is through their instrumentality. PU and PEOU are said to be instrumental for achieving rewards that extrinsic in nature through the potential increased performance resulting from using the technology, as such people "skip" the affective process and rely on a cognitive appraisal process that directly link performance to intentions based on the rewards (Davis et al., 1989). They further argue that the direct influence of perceived usefulness on behavioral intention-which led to the removal of the attitude construct from the model- is based on "*the idea that, within organizational settings, people form intentions toward behaviors they believe will increase their job performance, over and above whatever positive or negative feelings may be evoked toward the behavior per se. This occurs because enhanced performance is instrumental to achieving various rewards that are extrinsic to the content of the work itself, such as pay increases and promotions*" (pp.986).

One might argue that such statement is a general one that ignores many aspects of the workplace. For example, Robey (1979) suggests a model of user behavior for IT applications and argues that the use of the system is mostly associated with increased job performance, but that this relationship is mediated by both extrinsic and intrinsic rewards. Davis et al (1992) operationalize the variable "extrinsic motivation" using the same items which were used for

Perceived usefulness, while intrinsic motivation was operationalized using items such as enjoyable, pleasant, and fun. Venkatesh et al (2003) suggest that intrinsic motivation as operationalized by Davis et al (1992) is most similar to the attitude construct. One can argue that attitude shouldn't be viewed in the same way as intrinsic motivation; the TRA which provided the theoretical base for TAM advances behavioral intentions as the construct aimed at capturing motivational factors, and not attitudes. Furthermore, it is unlikely that the direct use of a system will lead to rewards such as pay raise or a promotion. Additionally, Bandura (1986) points to the value of considering intrinsic motivation. Armenakis et al (2007) argue for capturing both intrinsic and extrinsic rewards when measuring change recipients beliefs with regards to change efforts. Ryan and Deci (2000) also emphasize the importance of considering both intrinsic and extrinsic motivation. Conceptualizing motivation as either increased performance which is implicitly presumed as leading to rewards or playfulness and enjoyment (Venkatesh, 2000) might not be suitable for organizational settings where the use of the system is mandated.

The instrumentality premise along with the underlying implicit assumption that increased performance is a shared goal among organizational actors reflects a rather an untenable rational view of organizational reality (Jeyaraj et al., 2006). Within organizations, the use of a system of some sort has become a part of how jobs are done, thus the kinds of rewards attached to such usage might not be appropriately captured using traditional operationalization of constructs such as

Perceived usefulness (Davis, 1989). Furthermore, increased job performance might not be a shared goal between users; other factors such as power (Markus, 1983) might come into play. Additionally, increased job performance might not be instrumental in furthering an individual's higher level goals—depending on the context and the situation, individuals might have different “plans” to achieve their goals which might (or might not) be aligned with the goals that led to the introduction of the technology.

That being said this research is not dismissing the importance of intrinsic and extrinsic motivation, nor it is aimed at re-conceptualizing the motivational forces behind technology acceptance. This part of this research simply aims to test the validity of the claim that usefulness perceptions by end users are “instrumental” to achieving rewards. By testing the relationship between Perceived Usefulness and Attitude, more informed statements can be made about the relevance and importance of perceived usefulness as it relates behavioral intention.

Hypothesis 1a: Perceived usefulness will exert a positive influence on attitude.

Appropriateness:

Repenning (2002) suggests that managers' failure to “wholeheartedly” support an innovation regardless of their perceptions of how appropriate it is, is a recipe for failure. One can further argue that “blind” support is not likely, thus

appropriateness of the solution or the system becomes even more critical. As such, influencing appropriateness beliefs through messages and management actions becomes central to the change effort. Armenakis and Harris (2002) suggest that one of the key components of a change message is the part about appropriateness. Once the sense of a “need” has been established, the “search” for a solution that is appropriate for overcoming the discrepancy begins. But in situations where the solution is not of free choice but is rather selected by top management or any other higher decision making authority, influencing appropriateness beliefs of those who will be affected by the change is a more complex process; perceiving that there is a discrepancy and a need for action doesn’t automatically qualify the management’s suggested solution as the “appropriate” one. Rogers (2003) arguments with regards to compatibility with needs suggest that change agent’s roles include “helping” targeted employees identify and recognize that there is a discrepancy which need to be addressed. This role is complemented by the change agents’ additional role of influencing compatibility perceptions. Moreover, Rogers (2003) advances the generalized premise that meeting needs results faster rates of adoption.

Within the IS literature many constructs have been used which are somewhat related to the concept of appropriateness. For example, compatibility has been utilized in the study of technology adoption (Moore & Benbasat, 1991; Agarwal & Prasad, 1997; Karahanna et al., 1999). Other constructs which have been used by IS researchers and are relevant to the concept of compatibility are

task-technology fit (TTF) (Goodhue, 1995) and Job relevance (Venkatesh & Davis, 2000). But, the operationalization of compatibility and other relevant constructs has been more focused; items were reflective of how compatible the system or the technology is with one's work and tasks (e.g. "Using the WWW would fit into my work style" Agarwal & Prasad, 1997). Ward et al (2005) finds that perceived organizational benefits (POB) from adopting and using an information system have a significant direct influence on users' attitudes toward using the technology in both pre-implementation and post-implementation phases. The influence that POB has on pre-implementation attitudes suggests that if employees believe that the system will benefit the organization they will have more favorable attitudes toward its use in the future. At this early stage believing that the system will be beneficial to the organization implies that the system is appropriate.

For this research it seems more reasonable to address appropriateness at a more general level because end users' evaluation of the more specific constructs would likely be more relevant in later stages of the implementation project where they had enough direct experience with the system. As such the following the following hypothesis is proposed:

Hypothesis 1b: Appropriateness will exert a positive influence on Attitude.

Perceived Behavioral Control:

Beyond what has been presented in the literature review earlier, Ajzen (2001) argues that any human behavior, regardless of how mundane that behavior may seem, isn't completely under one's volitional control. Performing any behavior is subject to external and internal factors that might hinder the performance of that behavior. By introducing the concept of Perceived Behavioral Control (PBC) Ajzen (1985; 1991; 2001) aimed at expanding the TRA so that it can also be applied to a wider range of human behaviors which are not completely under the actor's volitional control. PBC refers to one's perceptions of the ease or difficulty associated with performing the behavior (Ajzen, 1991). PBC is a product of one's control beliefs, that is, beliefs about "the presence or absence of requisite resources and opportunities." (Ajzen, 1991:pp.196). The TPB ,as previously mentioned, has been used extensively in IS research (e.g. Mathieson, 1991; Taylor & Todd, 1995; Venkatesh et al., 2000;Brown et al., 2002; Venkatesh et al., 2003; Morris et al., 2005). The TPB offers us with the opportunity to account for more variables that might come into play when studying acceptance at this early stage of the acceptance phenomenon. The context of this research requires a richer theoretical foundation, than say TAM or TRA .Moreover, the UTAUT (Venkatesh et al., 2003), which came as an extension and integration of many of theories that has been used in the technology acceptance literature, can be considered an adaptation of the TPB.

Furthermore, Self-efficacy beliefs has been tested repeatedly in the context of technology use; the social cognitive theory was tested by Compeau et al (1999) and it has been found that self-efficacy beliefs play an important role in explaining computer usage. Self-efficacy beliefs were positively associated with affect (i.e. attitude), performance outcome expectations, personal outcome expectations, and usage. It was also negatively associated with anxiety. Bandura, the originator of the construct self-efficacy, argues that such beliefs affect one's extended efforts and persistence in behavior. The TPB's construct of perceived behavioral control (PBC) originated from Bandura's work on self-efficacy (Ajzen, 1991). Also, a strong and a positive implementation climate suggests that the organization is pursuing policies that are both supportive and facilitative of organizational members' use of the new system. This research argues that in a mandatory pre-implementation environment PBC will play a role in forming the attitude toward using the system rather than toward behavioral intention directly, thus it is hypothesized that:

Hypothesis 1c: PBC will exert a positive influence on Attitude.

Research Question 2:

In a mandatory adoption environment, and specifically in the pre-implementation phase, what are the variables that are expected to influence and explain employees' commitment toward the goal of adopting and using the system upon its rollout?

Goal Commitment:

The attitude construct has been removed from the TAM. This resulted from the fact that most of the research that utilized the model was conducted using technologies for which their adoption was mainly voluntary. In a mandatory adoption environment such as the one this research attempts to study the attitude of end users becomes even more critical (Brown et al., 2002). Research in mandatory environments reports a non-significant relationship between the attitude of end users and their behavioral intentions (Brown et al., 2002). Such findings can be attributed to the mandatoriness of system use. When users don't have a choice but to use the system, they will do so in order to comply with the mandate and to perform their jobs. Complying with influence to earn rewards or avoid punishments - which is termed as compliance (Kelman, 1958) - has been utilized by IS researchers as the means to represent the mechanism by which Subjective norm influences Behavioral intention in mandatory adoption environments (Venkatesh & Davis, 2000). However, the attitude construct has been absent in such research, as such one might argue that if the attitude construct had been present one should expect results that are similar to those found by Brown et al. (2002). Rogers (2003) refers to such situations as one in which there is an "innovation dissonance" where one's attitude is inconsistent with his/her actions.

Karahanna (1997, 1999) advanced the term symbolic adoption which refers to one's mental acceptance of the technology. Symbolic adoption can be used as a way to overcome the inconsistency- or lack of significance- in the attitude-behavior relationship. As such, one may expect that the relationship between attitude and symbolic adoption will be more consistent than the one between attitude and behavioral intention, especially in mandated environments. Rawstorne et al (1998) argue that, in a mandatory adoption environment, end users are expected to display more differences in symbolic adoption than they do in behavioral intention. Nah et al (2004) use symbolic adoption as a replacement of behavioral intention and has found support for the relationship between attitude and symbolic adoption; attitude, perceived ease of use and compatibility explain 65% of the variance in symbolic adoption with attitude being the main determinant.

For the purpose of this research which is mainly concerned with the pre-implementation stage, one can argue that the use of symbolic adoption might not be the best choice since the actual use of the system is still in the future, as such it is suggested that the use of goal commitment may be more suitable. Goal commitment refers "*to one's attachment to or determination to reach a goal, regardless of the goal's origin.*" (Locke et al., 1988: p.24). Committing to a goal, in the case of using the system upon its roll-out, offers us with the opportunity to broaden our expectations with regards to the effects of such commitment. Both intention to use and actual usage represent only one aspect of implementation

effectiveness and success when new technologies are implemented in organizations and success entails a wider spectrum of behaviors. Simply stating that one intends to use the system doesn't carry the kind of commitment that is to be expected when one is truly committed to a goal. Abraham and Sheeran (2003) argue that goals are important for research utilizing TRA and TPB because the intention behavior relationship doesn't account for goal achievement. Goal achievement entails a set of behaviors, not only one.

Bagozzi (1992) argues that desire to perform an action represents the missing motivational link between attitude and intention. He argues that desire implies motivational commitment, and that desires are distinct from both attitudes and intentions. Recently, Bagozzi (2007) suggested that technology acceptance should be viewed as goal striving process, and that action desire should be viewed as a mediator for the relationships between antecedents of action and the intention to act. He further argues for a new paradigm for understanding the technology acceptance phenomenon by introducing what he termed "The decision making core". This core has at its "heart" the following processes: goal desire → goal intention → action desire → action intention. In this research goal commitment is viewed as being similar to goal desire, and goal intention as being similar to behavioral intention.

Furthermore, social information processing theory suggests that commitment affects the creation of attitudes; by committing to an activity or a

goal, people tend to develop attitudes that are consistent with such commitment (Salancik & Pfeffer, 1978). Additionally, social cognitive theory (Bandura, 1986) suggests that peoples' actions are usually aimed at achieving future outcomes, as such, people adopt goals as means through which they evaluate their progress against. Wood and Bandura (1989) argue that goals are important because of their motivational effects and their role in building one's self efficacy beliefs. Sussmann and Vecchio (1982) propose a motivational framework where commitment is conceptualized as resulting from interpersonal influence processes (e.g. internalization and identification) and where such commitment is hypothesized to be a direct antecedent of behavioral intention. Within the change management literature, Herscovitch and Meyer (2002) propose a three component model of commitment to change which they define as "*a force (mind set) that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative.*" (pp. 475). Their findings support the premise that commitment to change is usually associated with desirable outcomes.

Also, Klein and Sorra (1996) introduce commitment in their innovation implementation model as a direct antecedent of implementation effectiveness. Osei-Bryson et al (2008) has found that innovation-values fit has a direct influence on implementation effectiveness by increasing employees' commitment to the ERP system which was being implemented. Additionally, Locke et al (1981) argue that one's performance is affected by goals. Such influence of goals on performance is manifested through its role in increasing persistence, directing

attention, motivating efforts. But for one to become committed to a goal one has to believe in his/her ability to achieve such goal (Bandura, 1986). Furthermore, findings support the premise that self-efficacy beliefs are important antecedents to goal commitment (Locke et al., 1981; Locke et al., 1988; Klein et al., 1999). Also, in their Meta-analysis, Klein et al (1999) reported that affect had a significant positive relationship with goal commitment.

Locke et al (1988) propose a goal commitment model where internal and external rewards are introduced as antecedents of goal commitment. Klein et al (1999) also find that attractiveness (i.e. valence) and expectancy (i.e. beliefs that performance will lead to outcomes) has a strong positive relationship with goal commitment.

Additionally, perceptions of implementation climate in an organization come about from what the employees experience in the organization. It reflects their interpretations of what they see, hear, and observe. Thus implementation climate can and should be viewed as a construct which subsumes the overall organizational policies and actions undertaken during an implementation process (Klein & Sorra, 1996). Klein and Sorra suggest that a strong implementation climate ensures that employees have the needed skills by providing adequate training or any other strategies. Ensuring employees skills increase their sense of self efficacy (Bandura, 1986). It provides them with the technical capabilities to deal with the uncertainties that might accompany their use of a new system. A

strong climate also provides incentives for use and disincentives to prevent non-use and other undesired behaviors. It also removes obstacles and provides an environment that is supportive of learning. Employees who perceive that their use of the new system is rewarded, supported, and expected should have a more positive inclination toward using the system. Klein and Sorra argue that a strong implementation climate may not lead to committed use by employees; they further argue that a strong climate by itself may lead to compliant use. Committed use depends on the fit between the innovation and the employees values. Dong et al. (2008) report that innovation-values fit is a significant determinant of affective commitment. Affective commitment reflects a desire to support a change; it reflects an internalization process where one genuinely believes that the change or the innovation is beneficial (Meyer and Allen, 1991). Thus it can be argued that implementation climate might influence Goal Commitment on the basis of a sense of obligation to use the new system. In other words, if employees report that they perceive that their use of the new system is rewarded, supported, and expected, one might expect that they, at least, might have a positive inclination toward committing to using the system, thus it is suggested that:

Hypothesis 2a: Implementation Climate will exert a positive influence on Goal Commitment.

Armenakis et al (2007) defines valence within the context of a change effort where it refers to the attractiveness associated with the expected outcomes

of the change. The concept of valence originates from Vroom's (1964) work on motivation. Expectancy-valence theories are built upon three basic concepts and their underlying processes: Valence, Instrumentality, and Expectancy. Simply stated, valence represents the value one attaches to the rewards resulting from his/her behavior, while expectancy is concerned with the perception that one's efforts will actually lead to performance at desired levels, and finally, instrumentality is aimed at capturing one's perception of the relationship between his/her performance and the outcomes (e.g. rewards) attached to such performance. Scholl (1981) suggests an integrated expectancy/equity model for work motivation where certain employees' behaviors may be viewed as result of their perceptions of the equity or fairness of the "rewards" they receive for engaging in such behaviors. In the context of an ERP implementation, Lim et al (2005), argues that when there is no consistency in outcome valences between top management and end users, system acceptance will be negatively affected. They further argue *that "without convergence in valence between rewards and user expectations, system users are likely to suspend their utilization of the ERP system, or, at best, maintain sustained usage level at which their expected yields are of an equivalent level of outcome valence for their efforts."* (pp. 145). This argument highlights the importance of valence perceptions in the context of a new system implementation. Users are expected to extend efforts that will go beyond what they have been doing for some time. There will be an interruption to their daily routines. They have to learn new skills, and they have to change their behavior and deal with uncertainty. As such, one might argue that in order for

employees to have a positive inclination toward commitment to using the new system, the organization as a whole and the management must be able to attach such usage to personally relevant rewards. Thus it is hypothesized that:

Hypothesis 2b: Valence will exert a positive influence on Goal Commitment.

Hypothesis 2c: Attitude will exert a positive influence on Goal Commitment.

The origin of the PEOU-A relationship has been based on the premise that self-efficacy beliefs (Bandura, 1982) will have direct effects on one's attitude. The easier a user feels that the system is to interact with the more intrinsically motivated he/she will be, thus affecting the attitude. From a temporal perspective, the effect of PEOU on behavioral intention was found to be stronger and more consistent in early stages of the technology use (Lee et al., 2003). Looking at TAM2 and UTAUT, both of which mainly looked at how the time of measurement affected the strength of the relationships between the models' constructs and their relative influence on constructs across time, it was found that PEOU had stronger influence on intention only at early stages of the process. The above discussion of goal commitment and the role of self-efficacy along with the suggestion that PEOU will play a more important role during the early stages of technology use, it is hypothesized that:

Hypothesis 2d: PEOU will exert a positive influence on Goal

Commitment.

Research Question 3:

In a mandatory adoption environment, and specifically in the pre-implementation phase, what are the variables that are expected to influence and explain employees' intentions toward adopting and using the system?

This research adopts a human agency perspective where human beings are viewed as “*self-organizing, proactive, self-regulating, and self-reflecting.*” (Bandura, 2006: p.164). Bandura (2006) argues that there are four core properties of human agency: intentionality, forethought, self-reactiveness, and self-reflectiveness. Humans are intentional in the sense that they regulate their behavior by forming intentions. Such intentions represent means to an end, and collective achievement is a product of collective intentionality. Forethought, on the other hand, is aimed at capturing the temporal aspects of human agency. By setting goals, committing to such goals, and predicting outcomes people introduce more control into their lives and they become more able to deal with uncertainty. Self-reactiveness is about action regulation; regulation of action involves not only selecting courses of action but also motivating oneself throughout the process. And finally, self-reflectiveness is concerned with the monitoring of one's behavior; it is about taking corrective actions. Bandura further argues, in consistence with social information processing theory, that human behavior is

socially situated, as such; it involves interactions with the environment and those who are active in it.

Along the same lines, Bagozzi (1992), argued for extending attitude theory by considering the cognitive and emotional self-regulatory processes. From the cognitive aspect, Bagozzi argues that the missing motivational link in the attitude-intention relationship is desire and that one having a desire implies motivational commitment to satisfy that desire, given one is able (i.e. self-efficacy) to do so. One might view the introduction of goal commitment to the research model as a step to overcome not only the missing motivational link in the attitude-intention relationship, but to also deal with the aforementioned attitude-intention-behavior inconsistency in mandatory adoption environments.

From an emotional self-regulatory perspective, it is argued that when faced with a situation where the future outcome is not desirable, people tend to avoid such behaviors, while in the case that the outcomes are desirable, people become more committed to the planned outcome and they intent to facilitate the attainment of that outcome. Bagozzi (1992) further suggested that the Subjective norm-intention relationship can be also viewed as a self-regulatory process based on “role identities”. Role identities, he argues, provide “*internal guidance to what one should do*” and “*are associated with motivational factors related to one’s self-concept and self-esteem and to the rewards and punishment one can receive through the role one enacts.*” (pp192). As such it is suggested that SN-BI

relationships can be explained in the context of what is termed “outcome-identity appraisal” processes. This process involves one weighing up how the outcomes of one’s behavior will ultimately affect his/her role-identity and the relationships one has with significant and important others. It is expected that one will tend to avoid behaviors that will threaten one’s self image and the relationships he/she has with others. On the other hand, one will commit to and facilitate behaviors that maintain his/her image and the relationships one has and care about. Thus, based on these arguments and those advanced earlier throughout the review the following is suggested:

Hypothesis 3a: Goal Commitment will exert a positive influence on Behavioral Intention.

Hypothesis 3b: Supervisor influence will exert a positive influence on Behavioral Intention.

Research Question 4:

In a mandatory adoption environment, and specifically in the pre-implementation phase, what role does LMX play in moderating the relationship between Supervisor Influence and the Model’s Variables?

To better understand the process through which Supervisor Influence affects the beliefs of the end users, the relationships between Supervisor Influence and the model’s variables are tested in a Moderated Model. As the focus of the

study and the main social influence variable chosen, Supervisor Influence was modeled as an independent variable for each of the study's variables. LMX is then introduced as a moderator to this relationship. The relationship between Supervisor Influence and each of the Model's variables is grounded in the Theory of Planned Behavior (TPB) which postulates that the Normative Beliefs and Subjective Norm Affect the Attitudinal and Control Beliefs (Ajzen, 1991).

Supervisor Influence and LMX as a Moderating Variable:

Research on social influence in organizational settings has generally been less than specific with regards to identity and the uniqueness of each socially influential entity (Rice & Aydin, 1991). For example, the theory of reasoned action (TRA) and the later theory of planned behavior introduced social influence in the form of the construct "subjective norm" which was defined as the perceptions of whether relevant others think that one should or shouldn't behave in a certain way. The generality of the term "relevant others" might be sufficient for some situations, but for others, we might need to dig deeper so as to understand the nature of the process. To their credit, both theories introduce normative beliefs as a second level for understanding the inner works of social influence. In a typical study, normative beliefs would be elicited from a representative sample where subjects are asked to identify specifically who the relevant others are. In the final survey, subjects will also be asked to rate their motivation to comply with the specific relevant others.

Compliance, identification, and internalization represent the underlying mechanisms by which social influence affects behavior (Kelman, 1958). Simply stated, compliance represents the type of influence where an actor adopts a specific behavior because he/she has to. This act of compliance occurs when the entity calling for the adoption of the behavior has the power to reward the compliant behavior and/or punish noncompliance. On the other hand, Identification is primarily based on feelings of obligation, that is, an actor adopts a behavior because he/she is expected to do so by a social entity that he/she belongs to or is attached to. Internalization occurs when social influence attempts are adopted by an actor because the behavior itself and the attached meanings to such behavior are intrinsically rewarding, in other words, the behavior is adopted because the actor wants to and is intrinsically motivated to do so (Kelman, 1958).

Social information processing theory (Salancik & Pfeffer, 1978) came as a response to the lack of consideration paid to the social context's role in affecting attitudes and behaviors in the work place. Compared to other theories which viewed workplace behaviors and decisions as being rooted in contemplation and need-satisfaction models, the theory argues that employees spend more time dealing with the consequences of their actions than the time they spend thinking about future behaviors and beliefs. As such they rely on cues from their social context as means to guide their behavior and shape their attitudes. Such arguments seem to go against the arguments which were used to build TAM2. Specifically, Venkatesh and Davis (2000), based on theories from multiple

disciplines, suggest that people engage in specific behaviors in an effort to achieve higher level goals. This research adopts the view that, as suggested by the social information processing theory, the complexity of the work place warrants a closer look at the social context and its role in forming attitudes and influencing behaviors in the workplace environments. And while people might behave in certain ways to achieve higher level goals sometime in the future, one can argue that in a mandated adoption environment, such as the one this research attempts to study, social influence is expected to play an influential role.

Social information processing theory further postulates that attitudes and beliefs are subject to influence from the social context. This influence operates through the process of observing and actually interacting with and within in the social context. Behaviors and comments from people that are socially relevant might shape one's perception of reality. The theory further suggests that social influence affects one's "attentional" processes. Certain aspects of the work place might become more salient as a result from the social influence process, thus resulting what might be termed as selective exposure (Salancik & Pfeffer, 1978). Let's take for example a department where a new system will be implemented. If much of the discourse is about how beneficial the system will be, then one might assume that positive attitudes are more likely. On the other hand, if the discourse is about how the system is designed to shift power bases, one can be almost certain that attitudes will be more negative if those affected perceive that they will be losing power (e.g. Markus, 1983).

Within the IS literature, the issue of leadership has not been addressed sufficiently, specifically, research on role of managers at lower levels within organizational hierarchies is almost absent. As mentioned earlier in the review, there appears to be a tendency to focus on top management support and commitment as being representative of leadership constructs, and while this might be important it doesn't offer a complete picture of the leadership processes that take place in the work place. Rice and Aydin (1991) suggested that relying on measuring the influence of "generalized" others contribute to the ambiguity surrounding the nature and the specifics of the social influence processes. Largely missing is an understanding of the role and influence of the direct supervisor on relevant acceptance variables.

Leonard-Barton and Deschamps (1988), in their study of managerial influence on the adoption of an innovation, found that not all subordinates perceive their manager's influence equally, and that such influence is mediated by individuals' characteristics. Those differences between employees can be looked at as contingencies. Managerial influence attempts aimed at individuals who are innovative and are receptive to innovation might not be as influential as attempts which target employees who "score" less on such variables. Yetton et al. (1999) developed a contingent framework for innovation implementation which is based on the nature of the technology. This study proposes another contingency which is viewed as being important in the context of a mandatory adoption environment.

This contingency is the quality of the relationship between a supervisor and his/her subordinates, that is, LMX.

Many LMX studies show that the quality of the relation plays an important role when it comes to influencing work related behaviors and experiences (Graen & Uhl-bien 1995; Liden et al. 1997). Also, LMX research suggests that employees with high quality exchanges enjoy open communication, while low quality exchanges are marked by a more closed communication pattern (Mueller & Lee 2002). In the change management literature, communication plays a critical role in reducing uncertainty and increasing employees' sense of control during change endeavors such as the deployment of a new information system that will alter many aspects of the employees' daily job routine, therefore information that is credible, trustworthy, and useful is pivotal to successful change (Klein 1996; Lewis 1999; Bordia et al. 2004). Furthermore, Michael et al. (2005) found support for the premise that supportive supervisor communication influences employees' contextual performance (i.e. behaviors which support the broader organizational environment) through leader-member exchanges.

High quality leader-member exchanges are characterized by trust, liking, respect, and support (Graen 2003, Liden & Maslyn 1998). As such employees in high quality relations are expected to view their leader as a credible source of information. Henderson et al. (2006) argue that the credibility of the source is an important determinant of *goal commitment*. They add that leaders who provide

clear and useful information regarding the rewards, purposes of the behavior, and develop their employees' sense of self efficacy will likely improve goal commitment amongst them. Leaders' can influence subordinates' perceptions of self-efficacy in many ways, one of which is showing confidence in their ability to perform well and paving their way by providing support (Locke & Latham 2002). On the other hand if leaders are not viewed as a credible source of information, their influence effectiveness becomes questionable. LMX has also been positively related to job attitudes and performance evaluations (Dienesch & Liden, 1986, Liden, Sparrowe, & Wayne, 1997). This positive relation with attitude adds support to the premise that leaders do influence followers' perceptions.

Looking at LMX through a different lens, Graen and Uhl-Bien (1995) argue that LMX is both a transactional and transformational social exchange process; the relationship begins with limited exchanges that are largely transactional in nature, but with time those transactions are either "transformed" where they become partnerships (i.e. high quality exchanges and in-group status) or they remain transactional (i.e. low quality exchanges and out-group status) (Bass 1999). As such, in-group employees enjoy a leadership experience that is transformational in nature. Stated alternatively, transformational leadership perceptions become dependent on the nature of the relationship (high vs. low quality), thus one employee might see a leader behavior as transformational, while another might not view it the same way. Wang et al. (2005) found that LMX fully mediated the relationship between transformational leadership and both task

performance and organizational citizenship behaviors. Their findings suggest that performance and OCB depend on how each member personally interprets the leader's behaviors. Also LMX was found to mediate the relation between transformational leadership behaviors and organizational commitment (Lee 2005).

Research findings left little doubt that transformational leadership is related to many positive and desirable organizational outcomes such as organizational commitment (Bycio et al. 1995), satisfaction with supervision (Podsakoff et al. 1990), organizational citizenship (Podsakoff et al. 2000), and employee performance (Yammarino 1993). Also transformational leadership is considered an important antecedent of successful organizational change efforts (Atwater & Bass 1995; Eisenbach et al. 1999). Bommer et al. (2004) found that managers who are more cynical with regards to change are less likely to engage in transformational leadership behaviors, thus suggesting that their followers will be less motivated to be more engaged in the change effort. On the other hand leaders who supported the change and engaged in transformational behaviors were effective in reducing subordinates' change related cynicism (Bommer 2005).

Those findings combined support the premise that leaders do have a role in influencing employees' work related perceptions- especially the ones who enjoy high quality relations with their leaders. The findings also highlight that the quality of the relationship between the supervisor and his/her subordinates represent the context and the lens through which they experience organizational

realities (Gerstner & Day, 1997). The leader's behaviors and his/her proximity to the member should make their influence that much stronger. Specifically, within high quality relationships it was found that both the leader and the member share to a great extent the way in which they experience and interpret organizational interactions (Graen & Schieman, 1978).

Lines (2005) argues that valence is an important predictor of the negativity or positivity of an attitude. It can be further argued that valence perceptions might serve as a motivational force that can help individuals make decisions with regards to their behavior as it relates to the attitude object. If one believes that he/she will be eventually rewarded for achieving a goal, then it will serve as a reminder that one should keep working toward that goal with a more positive attitude. Lines (2005) further argues that for attitude theory to successfully predict one's attitude toward change it must assess change recipients' beliefs as it relates to them personally. From an organizational perspective, a desired outcome might be increased efficiency or a streamlined production process, but for an employee this might mean nothing because such goal lacks personal relevance. In such circumstances the role of the direct supervisor becomes that much more important. A supervisor can tailor the organizational message and make it personally relevant to his/her direct subordinates. By being closer to the employees, a supervisor can reframe the organizational message in a way that motivates his/her subordinates.

From a leader member exchange perspective, and namely for higher quality exchanges, subordinates may expect that their acceptance of the new system will be beneficial to them. By accepting supervisor influence they are maintaining the relationship they both have. They might also expect that such acceptance and support behavior as a response to their supervisor influence will result them being rewarded in the future. Social exchange theory and the norm of reciprocity (Blau, 1964; Gouldner, 1960) provide further support for such arguments. Additionally, supervisor influence on both attitude and valence perceptions for employees with higher quality relationships can be viewed through the identification lens; by accepting the supervisor's influence they are benefiting, contributing, and maintaining the relationship they have with their supervisor.

Moving beyond the attractiveness or desirability of the outcomes associated with the change to the new system, the direct supervisor can be viewed as the main administrator of rewards and/or punishments for his/her direct subordinates. In many cases, the supervisor is responsible for performance reviews. He/she also controls many resources within the workplace; as such the supervisor is in powerful position where he/she can directly affect the valence perceptions of his/her direct subordinates.

Employees with lower quality exchanges might view the valence from the perspective of avoiding punishment, thus making it beneficial for them to comply

with their supervisor's influence attempts. Social information processing theory suggests that in the absence of "recognized" rewards, people rationalize and justify their behavior by adjusting their attitudes toward the task (Salancik & Pfeffer, 1978). What this suggests is that when rewards are absent, self-motivation comes into play so as one can rationalize and justify his/her behavior. One might further argue that if employees with lower quality exchanges score somewhat high on their valence perceptions, it might be viewed as their way of attempting to enhance the relationship they have with their supervisor. In a way their acceptance of such influence can be justified as their contribution to the effort of building a better relationship with their leader, thus:

The goal commitment model advanced by Locke et al. (1988) argues that "authority" and social influence do have an effect on goal commitment. Furthermore, the findings of Klein and Kim (1998) support the premise that supervisor support does influence employees' goal commitment and performance. Specifically, Klein and Kim found that employees who has high quality relationships with their supervisor and has low goal commitment perform the worst. This finding suggests that the supervisor in such case didn't support the assigned goals by the top management. Klein and Kim argued, "*Managers apparently undermined the store's incentive system by allowing or perhaps encouraging some employees to ignore the assigned performance standards.*" (pp. 94)

Earlier discussions of LMX provide evidence that employees generally view their supervisors as the main conduit of organizational policies. Furthermore, the proximity of the direct supervisor suggests that he/she will have at least some influence on how his/her subordinates experience and interpret organizational realities (Rice & Ayden, 1991). Tierney (1999) finds that employees with high quality relationships with their supervisor had the strongest “climate for change perceptions”, given that their supervisor also viewed the organization had strong climate for change.

Change agents attributes have been identified as being critically important to the effectiveness of influence strategies aimed at targeted employees. Armenakis et al (1993) suggest that attributes such credibility and trustworthiness of the change agent are instrumental to the success of readiness creation effort. Additionally, social information processing theory suggests that the influence of the social information on one’s attitude is dependent on the source’s credibility and status as well as their behaviors (Shaw, 1980). Rice and Ayden (1991) use a network proximity approach to study attitudes toward a new technology. The three types of proximity are relational, positional, and spatial all of which seem relevant to the interaction between and employee and his/her direct supervisor. Rogers (2003) discusses the issue of homophily and heterophily in the context of communication with regards to innovation adoption. Homophily implies similarity between two people in terms of beliefs and other variables. Rogers argued that communication is most effective when the involved parties are

homophilous. Also, influence attempts aimed at forming and/or changing attitudes are most likely to succeed when homophily exists. Additionally, identification processes might come into play. Kelman (1958) argues that by accepting influence through an identification process the individual accepting the influence looks at such process as a one in which he/she tries to maintain the relationship he/she has with the influencing entity. From the perspective of this research, employees who enjoy a higher quality relationship with their supervisor are more likely to experience such a process. By accepting the supervisor influence, HLMX employees are basically maintaining the relationship they have with their supervisor, and their acceptance of influence can be viewed as a currency of exchange within the larger exchange process. Furthermore, leaders and members who enjoy a high quality relationship are said to interpret and experience organizational reality in a similar fashion (Graen & Schiemann, 1978).

Venkatesh and Davis (2000) attempted to address the social influence issue in TAM2 by reintroducing the concept of subjective norm and another variable, namely, image. Social influence was hypothesized to operate mainly through the three aforementioned mechanisms: Internalization, Identification, and Compliance (Kelman, 1958). Most relevant to this research is the finding by Venkatesh and Davis (2000) that identification processes played a significant role in affecting acceptance throughout, that is, its effects were consistently significant through time. This influence was hypothesized to work through the effects of subjective norm on perceived usefulness.

In-role job performance is defined as “*actions specified and required by an employee’s job description and thus mandated, appraised, and rewarded by the employing organization*” (Janssen & Van Yperen 2004). LMX has been found to be positively related to in-role and extra-role behaviors (i.e. OCB) (Settoon et al. 1996). This relation is consistent with the characterization of high quality exchanges. Also, lower quality exchanges are accompanied with decreased levels of in-role performance which suggests that the quality of the exchange is related to employees’ effectiveness in terms of in-role performance and extra-role behaviors (Janssen & Van Yperen 2004; Tierney et al, 2002).

Organizational citizenship behavior represents actions and behaviors that are “discretionary” and go beyond the formal job description. Those behaviors are mainly captured by direct supervisors whose supportiveness may represent an important antecedent to such behaviors; supervisors represent a model for the kind of expected behaviors from employees. But more important to this study, those behaviors can, at some point, become a part of the social exchange process between supervisors and subordinates, thus those behaviors turn into a form of social currency for the reciprocal relation between the two (i.e. LMX)(Smith et al. 1983). LMX research has repeatedly found support for the positive relation between the quality of the relation and the subordinates’ citizenship behaviors (Gerstner & Day 1997; Hackett et al. 2003; Hoffman et al. 2003; Ilies et al. 2007; Settoon et al. 1996; Wang et al. 2005; Wayne et al. 1997; Wayne & Green 1993).

This research adopts the view, which is supported by research findings, that employees will not only do the tasks required by their formal job description but go beyond those requirements to maintain the kind of reciprocal relationship they have with their direct supervisors. In a recent meta-analysis that examined the LMX-OCB relation, a moderately strong, positive relation ($\rho=.37$) was reported (Ilies et al. 2007). The same study looked at the moderating role of the target of the behavior on the strength of the LMX-OCB relation. Two behaviors were studied: Individual-targeted and organizational-targeted. The first represent behaviors that directly serve particular individuals and indirectly the benefit the organization, while the latter represent behaviors that mainly benefit the overall organization. LMX was better at predicting individual targeted behaviors than organizational ones. This finding adds support to the notion that citizenship behaviors represent a currency in the reciprocal relationship between leaders and followers.

In another study, Sparrowe et al. (2006) found support for the moderating effects of LMX on the relationship between leaders' influence tactics and members' helping behavior. Helping behaviors represent discretionary behaviors targeted at other group members for the benefit of the whole group. This definition qualifies helping behavior as a type of citizenship behaviors, thus adding support to the LMX-OCB relation. Additionally, Wang et al. (2005) found a positive relationship between citizenship behaviors and task performance. LMX has also been positively related to performance (Gerstner & Day 1997; Klein &

Kim 1998). Howell & Hall-Merenda (1999) found that LMX is a significant predictor of follower performance and Wayne et al. (1997) reported that LMX has a positive relationship with performance, OCB, and favor doing-actions that benefit the leader-member relation. Thus, follower performance can be looked at as another type of currency in the social exchange process. Behavioral intention represents the direct antecedent of behavioral performance,

And Finally, Igbaria et al (1997) found that management support influenced PU and PEOU directly and usage indirectly. Along the same lines, Lewis et al (2003) found significant support for the relationship between top management support and PU and PEOU.

Based on the above discussions and the literature review, a moderated model testing the effects of Supervisor Influence on the research model's variables is proposed where LMX represents the moderating variable.

Building on the literature discussed above, the following hypotheses are proposed to represent the moderated model:

Hypothesis 4a: LMX moderates the relationship between Supervisor Influence (SupInf) and Behavioral Intention (BI); among higher quality exchanges a stronger SupInf-BI relationship is expected.

To explore the role of attitude in predicting Goal Commitment among different quality exchange it is hypothesized that:

Hypothesis 4b: LMX moderates the relationship among Attitude (Att) and Goal Commitment (GoalCmt); the higher the quality of the exchange the lower the Att-GoalCmt relationship will be. (Among Lower quality exchanges, Attitude plays a bigger role in influencing their Goal Commitment)

Hypothesis 4c: LMX moderates the relationship between Supervisor Influence (SupInf) and Goal Commitment (GoalCmt); among higher quality exchanges a stronger SupInf-GoalCmt relationship is expected.

Hypothesis 4d: LMX moderates the relationship between Supervisor Influence (SupInf) and Attitude (Att); among higher quality exchanges a stronger SupInf-Att relationship is expected.

Hypothesis 4e: LMX moderates the relationship between Supervisor Influence (SupInf) and Perceived Behavioral Control (PBC); among higher quality exchanges a stronger SupInf-PBC relationship is expected.

Hypothesis 4f: LMX moderates the relationship between Supervisor Influence (SupInf) and Appropriateness (App); among higher quality exchanges a stronger SupInf-App relationship is expected.

Hypothesis 4g: LMX moderates the relationship between Supervisor Influence (SupInf) and Perceived Usefulness (PU); among higher quality exchanges a stronger SupInf-PU relationship is expected.

Hypothesis 4h: LMX moderates the relationship between Supervisor Influence (SupInf) and Valence (Val); among higher quality exchanges a stronger SupInf-Val relationship is expected.

Hypothesis 4i: LMX moderates the relationship between Supervisor Influence (SupInf) and Implementation Climate; among higher quality exchanges a stronger SupInf-ImpClmt relationship is expected.

Hypothesis j: LMX moderates the relationship between Supervisor Influence (SupInf) and Perceived Ease of Use; among higher quality exchanges a stronger SupInf-PEOU relationship is expected.

CHAPTER 4:

RESEARCH METHOD

Sample and Context

Choosing a Site for the Study:

To test the theoretical model and the study's hypotheses, a search effort was initiated to find an institutional setting where a new system is being implemented. A University in the Chicago area was identified as a potential site for the study. The university was in the process of implementing a new content management system (CMS) at the institutional level. The main researcher met with the IS team to make sure that the setting meets the study's criteria.

The researcher explained to the IS team that the implementation project should be a new system, a new device, a new application, or a switch from a system to another one. In other words end users should be able to identify the novelty and the "newness" of the system. Furthermore, it was emphasized that a main goal of this research is to investigate the role direct supervisors play in end-users' acceptance of new information technologies within the work place, specifically in a "mandated" adoption environment at the pre-implementation stage; the pre-implementation stage this research refers to represents the pre-deployment period which generally spans from the time when the decision to adopt a new system is made by senior management to the time where the system is actually rolled out; the mandatoriness is established if the end users have no

choice in not using the new system. The focus of this research is on end-users and the process through which they accept/support/use the new system or reject or resist and underutilize it.

The initial meetings confirmed that the project meets this study's criteria. Further communications, meetings, and interviews were conducted to establish the fit between the setting and the study requirements and to collect more information about the project.

History of Content Management at the University:

A Content Management System is basically a system that optimizes the acquisition, production, management, and deployment of content on a Website. The University, at the leadership level has reached a conclusion that the web presentation of the institution is a vital recruiting, marketing, and communication tool and that it is reflections of the brand which can and should help the university strengthen its presence on the web.

At that time, prior to that conclusion, university websites were developed in a haphazard way where school entities would use the tools of their choice and in many instances hire a student worker or an outside entity to create a website. This process was the norm for many years and it got to the point where the university had a multitude of sites with no consistency in navigation or brand and content. Specifically, there were varying degrees of graphic sophistication,

outdated content, a lack of message continuity, disjointed view of the institution, and recurring ultimately high costs to retool those websites.

As such, the university's first experience with an institution-wide effort at CMS was between the years 2006-7. The CMS of choice was Serena Collage and it was a voluntary migration that involved some colleges and other university units. However, right after the project started the Company dropped the product and ceased any future development of its CMS system but promised to continue providing support. The choice of Collage was driven by many factors, mainly the fact that this system worked in a way where if the system itself went down the websites will remain up. Furthermore, the team tasked with looking for a CMS solution at the time has found that Collage was the most popular among similar institutions and it was concluded that it was the best fit for the higher education model. Additionally, when implementing Collage you were buying a product that was already built so it would not take a lot of optimization and customization to roll out.

The implementation team partnered with the six colleges and 46 other smaller units to move their sites from the existing systems they had to Collage. The implementation team ultimately trained approximately two hundred people on using Collage over the course of the implementation effort. As per the implementation team, the process didn't require ongoing training because it was ultimately decided to apply the "train the trainer" approach.

Collage was the first attempt to get “non-technical” people who are closer and more familiar with content creation to manage websites. Unfortunately, it was never completely realized because ultimately users had to be “technically qualified” at some level to work with it, so webmasters at colleges and units continued to play the main role. Some colleges decided that it was too difficult to use, abandoned it, and went back to their old ways of doing business. Add to that, the painful fact that the company decided to drop the product, thus giving a reason for university entities to go independently.

Even though Collage didn’t achieve the complete set of goals for its implementation, it wasn’t all bad as per the experience of the implementation team. The implementation project has achieved some degree of integration across the sites that migrated to Collage and in those instances produced sites that had similar navigation, branding, and look and feel. Additionally, it got people in the university more comfortable, even interested, in the idea of a system to manage content (CMS).

The SharePoint Migration project:

A couple of years later, the University leadership decided more “forcibly” that, in this day and age, the web is one of, if not, the most important recruiting tool for the institution. It was reiterated that it was no longer acceptable for a university website site to be stale or has outdated content and/or broken links. The

websites needed to be more integrated, consistent, containing fresh content that was timely and accurate.

At that point a team from a different area (The IS department) that implemented Collage was charged to develop a small website as a “pilot”. The leadership wanted to “see” and “feel” something before it gave directions to implement a university-wide system. The team knew that Collage was no longer an option. The team used Microsoft SharePoint 2007 to build the site and did it in a fairly short amount of time. It was an improvement over Collage and users of the website became less dependent on technical support. The team additionally built some other smaller websites using the same product. Soon after the launch of the “pilot” website, the leadership directed the team to start a university wide project to implement a Content Management System that can take the Institution’s web presence to the next level.

The project team, at that time, believed that they had built enough experience with SharePoint and learned that SharePoint 2010 was heading towards providing more web content management capabilities. This experience gave SharePoint an edge over other products in the market. Still, the team examined two other platforms and compared the three products based on preset criteria.

The Team ultimately chose SharePoint 2010. It provided “non-technical” authoring capabilities where people who create and change the content will be

able to do so with minimal tech-specific knowledge. Furthermore, it was decided that SharePoint was the “most” user friendly of the platforms and that it met all of the technical requirements including: the .net environment, compatibility with the existing infrastructure, the fact that the team won’t need “retooling”, and the platform’s flexibility. Another major point was the fact that SharePoint was a Microsoft product. The team felt, after the Collage experience, they needed a product for the long run where they don’t have to worry about the company dropping a product. Microsoft provided this kind of “stability” in a volatile environment. Also, SharePoint provides collaboration capabilities among many other things which made it more attractive. SharePoint came with the campus agreement too, so the cost from architectural and licensing perspective was minimal – but money wasn't the main driver.

As soon as the IS team made the decision to go with SharePoint, they approached the Marketing team which Implemented the Collage migration project and presented SharePoint to them. Both teams agreed to go ahead and present their choice to the leadership of the university. As soon as the green light was given a team was built from both entities. The IS team was mainly involved in the architectural and infrastructure aspects while the marketing team was mainly tasked with the design and functionality aspects of the project. The teams worked closely and spent a year planning the project. The planning phase allowed both teams to build an experience in working together, plus the scope of the project

was one the university's largest because it will involve and touch almost all the parts of the institution that have a web presence.

Teams and committees were formed for the purposes of planning, implementing, governing, and providing input from the involved parties at the university. Colleges/Departments working groups were formed with the goal that they provide the necessary input on the development of the applications and the functionalities. Additionally, a governance committee was formed to prioritize the university sites.

From the IS's team perspective the biggest hurdle was getting the infrastructure correctly. It was a risky move because the choice of SharePoint was made a couple of months after Microsoft launched the 2010 version. A lot of resources were needed and many of the existing resources were directed toward the project. Additionally, there was scarcity in the consulting market because not many people had experience with SharePoint 2010 as the University was of the earlier adopters in the higher education field, so finding people with the right infrastructure building experience was challenging.

From the Marketing team's perspective the hurdles were typical of two different groups working together where they sometimes see the issues as they rise from an "opposite" side of each other. Additionally, it felt as a learning experience because of the minimal experience with SharePoint at the Marketing

side. Also, the team faced difficulties in the decision making process as the design process went along. Decisions needed to be made regarding a multitude of issues as planning went on such as: usability, accessibility, governance, structure, and other issues at the enterprise level.

Perspectives on Power and Top Support:

The SharePoint Implementation team presented and kept pushing the idea that this project is a migration project. This was meant to manage the expectations and prevent scope creep and changing requirements. SharePoint was a departure of the existing model of “development” toward a content creation environment where content is central. The additional capabilities to manage, create, and publish content in a more timely and consistent manner were a big selling points to top management at each site.

From a project support perspective, the SharePoint implementation team had top support from the university leadership. The mandate to implement SharePoint meant that the implementation team was able to focus on selling the migration project across the university. The implementation team approached selling the project from the perspective of positive influence. The team made an enormous effort early on and during the planning stage to educate people on the benefits of Content Management Systems and namely SharePoint 2010. Additionally, many of the parties that were involved with the earlier Collage implementation were eager to have a new CMS. The experience with Collage

gave many of them hands on experience on the benefits of such systems. The team sensed that people had more acceptance as prospective users were mainly asking about the implementation schedule and functionality issues and what they can do to harness the best of the CMS. Furthermore, the successful launch of some sites created early acceptance among the university entities.

The mandatoriness of the project stems from the fact that the SharePoint implementation was a strategic decision by the university leadership. The implementation team has the “stick” but it was not used nor will it be unless it was necessary. Once the foundation for the project was built the only option that the involved entities had was getting on board because no other options exist. However, by being involved, the university entities have a say in many aspects of the implementation. The implementation team believed that the attractiveness and the improvements that SharePoint will bring are enough to keep people inline without the need of a “heavy handed” enforcement. Furthermore, the implementation team made sure they had a consistent message when approaching the parties involved. From a technical enforcement perspective, the team had the power to tell people that if they want to be a part of “University.edu” they have to have SharePoint, thus making the cost of not getting on the SharePoint bus very high.

Sampling Procedure:

A Purposive sampling technique which was followed by “snowball” sampling was used to recruit participants. Purposive sampling is mainly concerned with “*selecting units (e.g., individuals, groups of individuals, institutions) based on specific purposes associated with answering a research study’s questions.*” (Teddlie & Yu, 2007)

To select participants for the study, the researcher was in close contact with the SharePoint Implementation Team who identified prospective users based on the implementation plan. The SharePoint implementation team, throughout the process of planning the project, has identified potential users for project training/communication purposes. The SharePoint Implementation plan consisted of establishing working groups from the implementation sites. Those groups served as the main communication tool for the implementation team where requirements and other project related issues were discussed. The working groups were made of individuals who have been identified as the primary resources of input regarding the applications and “widgets” development. The working groups’ members have been identified as a match for the criteria set for prospective participants in this study. The members will be using SharePoint 2010 upon its rollout as the main tool for content management at their respective sites. Additionally, the training plan, which was based on input about the users of the system, was used to identify prospective participants for this study.

The researcher was introduced to the main contacts at the implementation sites through e-mail and by attending some of the working groups' meetings. The researcher visited the main contacts from the working groups at their sites and requested they identify prospective users of the SharePoint 2010. Furthermore, those meetings were used to explain the purpose of this study and to ensure that the prospective participants match the criteria for the study.

Once the lists for prospective users were compiled, an introductory email was drafted by the researcher with the counsel of the SharePoint Implementation Team. The email invites prospective participants to take part in the survey and explains that it is for this study's purposes only and where anonymity was ensured. The email recipients were given the option to opt out of further communications if they didn't want to be a part of the study. The introductory email was sent to around 220 prospective users. A final list of 200 willing participants was compiled based on the responses from the introductory email. The finalized list of participants was sent an e-mail containing a link to an anonymous online survey.

Survey Refinement:

This research was conducted at the individual level of analysis and used the survey method in an organizational setting as the mean to collect the data. This Self-report method was used to measure the latent variables. Survey items measuring all the variables were adopted from previous studies where they have

gone through multiple reliability and validity tests. All measurements used a 5-point Likert scale.

Even though the scale items were adopted from existing literature with an established reliability and validity, the researcher took additional steps to refine the wording of its items and identify any problematic ones. The first step included conducting a focus group with the SharePoint Implementation Team. The goal of this was manifold. First, the team has the chance to point to items which they feel are inappropriate or might affect the implementation project. Second, as the team charged with the implementation, they were asked to identify the types of users for the system. Third, the team was asked to review the survey and comment on its content as implementers. This was meant ensure that the study variables cover the main aspects of the phenomenon of interest.

The focus group discussions revealed some issues with the wording of some items as it relates to the project. Also, the words used in the scaling of some items were modified to better fit the context of the study based on the group's feedback. The group discussions revealed that the variables as represented by the scale items seemed to be able to capture the phenomenon of interest. The survey was further reviewed by the researcher and the necessary changes were made accordingly. The PBC item "Given the resources, opportunities, and knowledge it will take to use the system, it would be easy for me to use SharePoint upon its rollout" was removed based on the review and some of the comments that were

made by members of the group. The item wording was extremely similar to the items measuring the variable PEOU. The majority of the group also commented on other items such as: The Goal Commitment items “It is hard to take the goal of using SharePoint upon its rollout seriously” and “It wouldn’t take me much to abandon the goal of using SharePoint upon its rollout”. Further deliberations revealed that the mandatory nature of the project and the fact that prospective users haven’t interacted with the system yet made those items inappropriate for the purposes of the study. Additionally, the Valence variable item “With the change to SharePoint in my job I will experience more self-fulfillment” was mentioned by some group members as being too general because using the system or creating content most likely will not be the main job for the prospective users. Also, the item, to them, stood out and seemed to be outside “realm” of the survey in general. The decision was made to keep the items and test them in the following refinement step.

Some additional minor changes in the wording were made in order to reflect the temporal requirements of the study and the context of the implementation project.

The next step included identifying some users that have already went through the change to SharePoint 2010. The SharePoint Implementation Team introduced the researcher to a group of users that had their website up using SharePoint 2010. The researcher sent the five users who agreed to participate in

the survey refining process an email containing a link to a the final draft of the online survey. They were asked to not to share the link or the survey with any other people. The researcher, in the email, asked the users to comment on the time/length of the survey. Also, the users were asked to identify and comment on the wording and any scale items which they felt are ambiguous, inappropriate, or don't relate to the project.

There were no major issues. One item in specific was mentioned by four of the users. One of the items measuring the attitude construct, namely: "All things considered, my adoption and use of SharePoint upon its roll out is: Extremely Wise...Extremely Foolish". The users felt that this item "made little sense." The decision was made to remove this item since attitude is still captured by three other items. Interestingly, the three other items identified by the SharePoint Implementation team in the first step were mentioned by three members of the group. The decision was made to remove the items. Goal Commitment will still be measured by three items and Valence by four items.

The Final Sample:

As mentioned earlier a finalized list of 200 willing participants was used to send the online survey link. The survey tool collected the data anonymously. Two days before sending the e-mail link, the willing participants were sent an email notifying them that they will be receiving the survey link in two days. The

email described the nature of the study, that no identifying information will be collected, and that the analysis of the data will be at the aggregate level.

Once the email containing the survey link was sent, the recipients were given a one week window to complete the survey. A reminder was sent three days later and a final reminder was sent one day before the deadline. Of the 200 willing participants 172 people participated in the survey. The data was screened for uncompleted surveys and any anomalies. A final list of 148 usable surveys was used in the data analysis.

To ensure the adequacy of the sample size, the researcher followed the recommendations of Hair et al (2013). The authors, while not dismissing the “10 times rule” commonly used in studies using PLS-SEM, state that researchers should determine the required sample size based on a power analysis that takes into consideration the part of the model with largest number of predictors. The “10 times rule” simply states that the sample size should be ten times the maximum number of arrowheads pointing at any latent variable in the research model. For example, if the latent variable with most arrowheads pointing at it has seven predictors, then the minimum sample size would be 70. Hair et al (2013) recommend using statistical power analysis for multiple regression as provided by Cohen (1992). Choosing the most common significance level (.05), the statistical power of (.80) with a minimum R^2 of (.5) and a maximum of seven arrows pointing at a construct, the table reveals a minimum sample size of 51.

Additionally if we apply the “10 times rule” the minimum sample size would be 70. The sample size of 148 is more than satisfactory for PLS-SEM analysis purposes.

Control Variables:

Five control variables were chosen for this study. Control variables allow researchers to account for variance unexplained by the hypothesized model variables. Additionally, control variables may uncover group differences in the hypothesized model. The main four variables which has been used very commonly in technology acceptance studies and the IS literature in general are Age, Gender, Education, and Organizational tenure (e.g. Teo et al., 1999). Another control variable was adopted from LMX studies, namely, LMX dyad tenure (e.g. Wayne et al., 2002). This control variable specifically measures the length of relationship between the employee and his/her direct supervisor.

The Study's Variables:

Behavioral intention BI: The study used three items to measure the Behavioral Intention to use system (e.g. I intend to / use SharePoint to perform my tasks that require its use once it has been rolled out.) The items were adopted from Taylor and Todd (1995). The respondents indicated their agreement with the statements using a 5-point Likert scale from Strongly Disagree to Strongly Agree.

Attitude: Three items were used to measure the Attitude variable (e.g. All things considered, my adoption/use of SharePoint upon its roll-out is). The items asked the respondents to choose from a 5-point Likert scale which ranged from “Extremely worthless/negative/bad” to “Extremely Valuable/positive/good”. The items were adopted from Fishbein and Ajzen (1980).

Goal Commitment: Three items adopted from Klein et al. (2001) were used to measure goal commitment (e.g. I am strongly committed to pursuing the goal of using SharePoint upon its roll-out.) The respondents were asked to indicate their agreement with a 5-point Likert scale ranging from Strongly disagree to Strongly agree.

Appropriateness: Four items adopted from Armenakis et al. (2007) were used to measure this variable. Respondents were asked to indicate their degree of agreement from Strongly disagree to strongly agree for items like (“When I think about the change to SharePoint I realize that it is appropriate for our organization.”)

Perceived Usefulness: Three items adopted from Davis (1989) were used to measure this variable. Respondents indicated their agreement with items like “Using SharePoint would enhance my effectiveness in my job.” Using a 5-point Likert scale ranging from strongly disagree to strongly agree.

Perceived Ease Of Use: Three items were used to measure this variable. The items were adopted from Davis (1989) (e.g. It would be easy for me to become skillful at using SharePoint to perform my tasks.) The respondents indicated their agreement with the statement using a 5-point Likert scale ranging from strongly disagree to strongly agree.

Valence: The four items measuring this variable were adopted from Aremnakis et al. (2007) (e.g. The change to using SharePoint upon its roll out will be beneficial to me.) Similar to other items, the respondents indicated their agreement with the statements using a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree.

Implementation Climate: The study adopted five items from Klein et al. (2001) to measure this variable. The respondents indicated their agreement with items like “The SharePoint Implementation/Migration project is a top priority here”. The items used a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree.

Supervisor Influence: The measures were adopted from Thompson et al. (1991) and Taylor and Todd (1995). Items like “My supervisor would think that I should use SharePoint upon its roll out” were used to measure the variable where respondents used a 5-point liker scale ranging from Strongly Disagree to Strongly Agree.

Perceived Behavioral Control: Three items were used to measure this variable. The items were adopted from Ajzen (1991) and Taylor and Todd (1995). Similar to other items in the survey, the respondents indicates their agreement on 5-point Likert scale (e.g. My Supervisor is supportive of the use of SharePoint for my job upon its roll out.).

Leader-Member Exchange (LMX): To measure this variable the study adopted the LMX-7 scale (Graen & Uhl-Bien, 1995). As the name suggests the scale uses seven items where respondents reply to questions like: “How would you characterize your working relationship with your supervisor?” and “What are your expectations to receive support from your supervisor when solving work related issues?”

LMX (Graen & Uhl-Bien, 1995):
How often do you feel that your supervisor is satisfied with your work; Do you know where you stand with your leader?(Rarely...Very Often)
What are your expectations to receive support from your supervisor when solving work related issues? (None...Very High)
Overall, how well does your supervisor understand your job / problems and needs? (Not a bit...A great deal)
How well does your supervisor recognize your potential? (Not at all...Fully)
How would you characterize your working relationship with your supervisor? (Extremely Ineffective...Extremely Effective)
I have enough confidence in my supervisor that I would defend and justify his/her decisions if he/she weren't present to do so. (Strongly Agree...Strongly Disagree)
Regardless of the amount of formal authority your supervisor has, what do you think are the chances that your supervisor would use his/her power to help you solve problems in your work? (None...Very High)
Appropriateness (Armenakis et al., 2007): (Strongly Disagree...Strongly Agree)
The change to SharePoint will improve the performance of our organization.
I believe that the change to SharePoint will have a favorable effect on our operations.
When I think about the change to SharePoint I realize that it is appropriate for our organization.
I believe that the change to SharePoint will prove to be the best for our situation as an organization.
Attitude (Fishbein & Ajzen, 1980):
All things considered, my expectation and use of SharePoint upon its roll-out is: (Very Bad...Very Good)
All things considered, my adoption/use of SharePoint upon its roll-out is: (Very Worthless...Very Valuable)
All things considered, my adoption use of SharePoint upon its roll-out is: (Very Negative...Very Positive)
Behavioral intention (Taylor & Todd, 1995): (Strongly Agree...Strongly Disagree)
I intend to use SharePoint when it is implemented/rolled out.
I intend to use SharePoint frequently upon its roll-out.
I intend to use SharePoint to perform my tasks that require its use once it has been rolled out.
Goal commitment (Klien et al. 2001): (Strongly Disagree...Strongly Agree)
Quite frankly, I don't care if I achieve the goal of using SharePoint upon its roll-out or not.
I am strongly committed to pursuing the goal of using SharePoint upon its roll-out.
I think that using SharePoint upon its roll-out is a good goal to shoot for.
Implementation Climate (Klein et al., 2001): (Strongly Disagree...Strongly Agree)
People here really don't care about the success of SharePoint Implementation/Migration project.
In DePaul, there is a big push for people to make the most of the change to SharePoint as a content management system
At DePaul, the SharePoint Implementation/Migration project takes a back seat to other projects.
People here put a lot of effort into making the SharePoint Implementation/Migration project a success
The SharePoint Implementation/Migration project is a top priority here.
Perceived Ease of Use (Davis, 1989): (Strongly Disagree...Strongly Agree)
I would find it easy to get SharePoint to do what I want it to do when it comes to performing my tasks
I think SharePoint will be easy to use.
It would be easy for me to become skillful at using SharePoint to perform my tasks.
Perceived Behavioral control (Ajzen 1991; Taylor & Todd, 1995): (Strongly Disagree...Strongly Agree)
I believe that I will have the resources necessary to use SharePoint.
I believe that I will have the Knowledge necessary to use SharePoint upon its roll-out.
Perceived Usefulness (Davis, 1989): (Strongly Disagree...Strongly Agree)
I believe I would find using SharePoint in my job to be useful.
Using SharePoint would enhance my effectiveness in my job.
Using SharePoint in my job would improve my performance.
Valence (Armenakis et al., 2007): (Strongly Disagree...Strongly Agree)
In the long run, DePaul's decision to adopt SharePoint will be worthwhile for me.
The change to using SharePoint upon its roll out will be beneficial to me.
With SharePoint implementation, I don't believe there is anything for me to gain.
Supervisor Influence (Thompson et al. 1991; Taylor & Todd, 1995): (Strongly Disagree...Strongly Agree)
My Manager/Supervisor is supportive of the use of SharePoint for my job upon its roll out.
My supervisor would think that I should use SharePoint upon its roll out.
I will have to use SharePoint in performing some of my tasks because my supervisor expects me to do...

Figure 9: The final survey items used to measure the variables and in the analysis

The Data analysis:

The Partial Least Squares (PLS) method was used to test the research model using the software SmartPLS 2.0. Structural Equation Modeling is a second generation technique which enables researchers to test the relationships between multiple independent and dependent variables (Gefen et al., 2000). PLS is a structural equation modeling technique that has been used extensively in the IS field (Ringle et al. 2012; Urbach& Ahlemann 2010).

Generally speaking, the two most common approaches for structural model estimations are the Covariance Based SEM (CB-SEM) and the Variance based PLS. The choice of one of the two modeling methods by researchers depends on criteria that make each method unique in its application. Mainly, the choice depends on the objective of the research and the statistical assumptions among many other things. Hair et al. (2011) summarize the distinction between the two methods and when to choose each:

“The philosophical distinction between CB-SEM and PLS-SEM is straightforward. If the research objective is theory testing and confirmation, then the appropriate method is CB-SEM. In contrast, if the research objective is prediction and theory development, then the appropriate method is PLS-SEM. Conceptually and practically, PLS-SEM is similar to using multiple regression analysis. The primary objective is to maximize explained variance in the dependent constructs but additionally to evaluate the data quality on the basis of

measurement model characteristics. Given PLS -SEM's ability to work efficiently with a much wider range of sample sizes and increased model complexity, and its less restrictive assumptions about the data, it can address a broader range of problems than CB -SEM."

PLS is a component based approach which places minimal demands of sample size and distributional assumptions. Additionally, it has the ability to handle complex models with multiple relationships. PLS applies an ordinary least squares (OLS) based method for the purposes of the estimation procedure and uses the data it is fed to estimate the path coefficients while minimizing the error terms of the dependent variables thus maximizing R^2 values for those latent dependent variables (Hair et al. 2013).

This PLS feature makes it more suitable for theory development and variance explanation. The choice of PLS for this research was mainly driven by two factors, namely (Hair et al. 2013):

- The goal is predicting key target constructs and/or identifying key "driver" constructs.

- The structural model is complex.

Other issues that played a role in choosing PLS were (Chin 2010):

- The soft distributional assumptions: PLS is non-parametric procedure with minimal requirements regarding the normality of the data. Furthermore, PLS is robust against Skewness and Multicollinearity (Cassel et al. 1999)
- The research is exploratory in nature: While studying Technology Acceptance has been fairly established in the IS field with numerous articles looking at many aspects of the phenomenon, the study of TA at the pre-implementation phase in a mandatory environment is relatively new.

Data Screening and Preparation:

Before the analysis of the data using SmartPLS 2.0, the data set was examined to identify any missing data. The 15% rule was followed where any observation missing 15% or more of its answers is removed. None of the observations were subject to removal due to missing data.

Hair et al. (2013) recommends using mean replacement when less than 5% of the values per indicator are missing. The data was screened visually multiple times to identify any missing data; fortunately, none of the indicators were missing any values. Additionally, the screening process involved looking for straight lining and any inconsistent response patterns. As mentioned earlier, 172 surveys were submitted. Of the 172, 20 were uncompleted and thus were subject to removal in the first round. Two other completed surveys were removed due to inconsistent response patterns. One respondent for example responded to a couple

of reverse worded items in a way that contradicted his/her response to the items measuring the same variable.

Hair et al. (2013) recommends verifying that the data is not “too far from normal” even though PLS is a nonparametric methods that doesn’t require the data to be normally distributed. The authors recommend testing the data for Skewness and Kurtosis to ensure that the data is not extremely far from normal as such data might inflate standard errors and decrease the algorithm’s ability to detect the significance of some relationships. Skewness assesses whether the variable’s distribution is symmetrical (i.e. stretched to the left or right). Kurtosis on the other hand assesses the peakness of the variable’s distribution. Hair et al’ (2013) present a general guideline that values for both Skewness and Curtosis should be between +1 and -1. However, research on the robustness of PLS against skewness and multicollinearity has shown that PLS performs well even when the data is skewed or multicollienarity exists between latent variables (Cassel et al., 1999).

The data was tested for both Skewness and Kurtosis and all variables showed values within the acceptable range except for LMX which showed a slight increase above the recommended value. However, the deviation value for LMX from the +1 to -1 guideline is minimal. The table below also shows the descriptive statistics for the study’s variables.

Descriptive Statistics								
	N	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
						Std. Error		Std. Error
LMX	148	3.9228	.79117	.626	-1.002	.199	.481	.396
Approp	148	3.6841	.81251	.660	-.662	.199	.680	.396
Att	148	3.7162	.74217	.551	-.238	.199	-.153	.396
INT	148	4.1734	.66379	.441	-.777	.199	.877	.396
GoalCmt	148	4.0135	.73038	.533	-.784	.199	.761	.396
ImpClmt	148	3.6622	.67847	.460	-.705	.199	.439	.396
PU	148	3.6171	.83060	.690	-.417	.199	.180	.396
Val	148	3.7995	.76856	.591	-.515	.199	.149	.396
SupInf	148	3.9505	.73191	.536	-.648	.199	.300	.396
PBC	148	3.7466	.76153	.580	-.643	.199	.183	.396
PEOU	148	3.6441	.73325	.538	-.698	.199	-.050	.396
Valid N (listwise)	148							

Table 2: Descriptive Statistics/Skewness&Kurtosis values.

Gender	Frequency	Percent
Male	70	47.3
Female	78	52.7
Total	148	100
Age	Frequency	Percent
20-29	20	13.5
30-39	61	41.2
40-49	39	26.4
>50	28	18.9
Total	148	100
Tenure	Frequency	Percent
0-2yrs	21	14.2
2-5yrs	41	27.7
5-10yrs	36	24.3
>10yrs	50	33.8
Total	148	100
Education	Frequency	Percent
High School	1	0.7
2 Year College	7	4.7
Bachelors Degree	37	25
Masters Degree	88	59.5
Doctoral	15	10.1
Total	148	100
LMX Length	Frequency	Percent
0-6months	12	8.1
6months-2yrs	38	25.7
>2yrs	98	66.2
Total	148	100

Table 3: Demographics and Control Variables

Specifying the PLS-SEM Path Model:

The PLS specification process starts by specifying the structural model which shows the relationships between the study's variables. The modeling procedure doesn't allow circular relationships. The paths in the model represent the research hypotheses, that is, the hypothesized relationships between the model's latent variables. The PLS algorithm tests the significance of the relationships (i.e. paths) and produces the path coefficients with the R^2 (i.e. the explained variance) of the model's dependent variables. The figure below shows the hypothesized relationships for the original model without the moderating effects. The moderated model and the hypotheses for the moderated relationships will be tested in a later step.

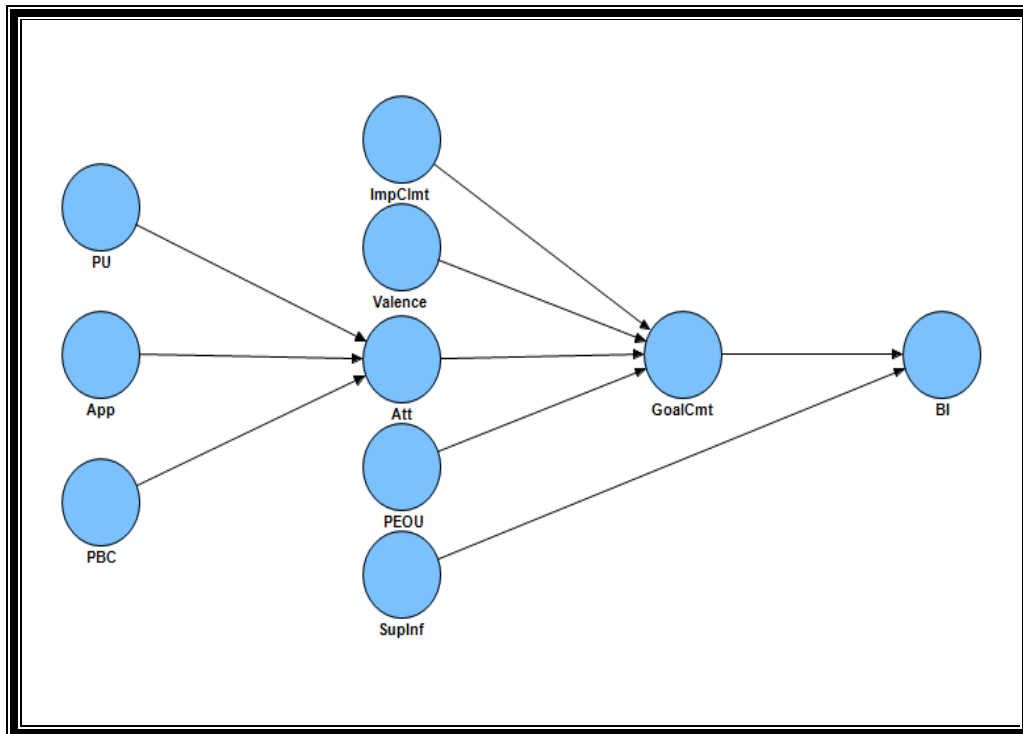


Figure 10: The Path Model

A PLS path model is represented using two models that constitute the foundation of the PLS method. The first model is called the measurement model which relates the measured variables (indicators) and their corresponding latent variables (constructs). This model is also termed the Outer Model. The second model relating the model's variables is called the structural model which is also termed the Inner Model (Tenenhaus et al., 2005).

Measurement Model Evaluation:

In contrast to CB-SEM, PLS doesn't have a goodness of fit criterion. As such, PLS depends on aspects that are related to model's predictive capabilities to evaluate the model's quality. As per Hair et al. (2013):

“PLS focuses on the discrepancy between the observed (in the case of manifest variables) or approximated (in the case of latent variables) values of the dependent variables and the values predicted by the model in question....the evaluation of the measurement and structural model results in PLS-SEM builds on a set of nonparametric evaluation criteria and uses procedures such as bootstrapping and blindfolding.”(p.96)

The evaluation of the measurement model is mainly concerned with the reliability and the validity of the constructs' measures. This evaluation procedure focuses on the internal consistency (composite reliability), indicator reliability,

convergent validity, and discriminant validity (Chin, 2010). Specifically, composite reliability is used to assess the internal consistency of the measurement model, while individual indicator reliability and the average variance extracted (AVE) are used to assess the convergent validity. Furthermore, the Fornell-Larcker (1981) criterion and the cross loadings are used to evaluate the discriminant validity (Hair et al. 2013).

While Cronbach's alpha is the most common criterion to evaluate the internal consistency reliability, in PLS it is recommended to use Composite Reliability as the main criterion to evaluate internal consistency. Hair et al (2013) argue that Cronbach's alpha assumes equality of reliability among all the indicators measuring a construct, is sensitive to the number of measurement items, and has a tendency to underestimate internal consistency reliability. Furthermore, the PLS algorithm prioritizes the indicators according to their respective reliability. Thus, it is recommended to use the composite reliability as the main criterion to evaluate the internal consistency reliability of the measurement model. Composite reliability values between .70 and .90 are considered to be satisfactory.

For Convergent validity purposes, the assessment depends on the Average Variance Explained (AVE) and the outer loadings (Indicator reliability). To demonstrate convergent validity, the item loading should be .708 or higher (Hair et al.2013) and the AVE for the construct should be higher than .50 (Fornell & Larcker, 1981). To establish Discriminant validity, the cross loadings for the

indicators are examined. Each construct's indicators should load highest on their associated construct. That is, if there are cross loadings that are greater than the indicators' outer loadings we have a discriminant validity problem. Discriminant validity is further established by using the Fornell-Larcker criterion. The criterion states that the square root of each construct's AVE should be greater than its highest correlation with any other construct. This can also be defined as having the AVE for each construct being greater than the squared correlation with all other constructs (The approach utilized in this study).

Two items were deleted from the analysis. One item measuring PBC "I will have control over using SharePoint" has low indicator reliability score (.54) which is unacceptable. Furthermore, deleting the item increased the other two items' reliability. The other item excluded from the analysis was item number one for Valence "The change to using SharePoint in performing some of my tasks will increase my feeling of accomplishment". Even though the item's reliability was acceptable (.79), it had the lowest outer weight and it increased the correlation of "Valence" with the variables Perceived Usefulness and Appropriateness. Also, the item's loading value on PU was extremely close to its loading on Valence.

The tables below display the results of the measurement model analysis. Table (3) shows the correlations among the model's variables. While the following table (4) shows the Composite reliability, AVE, Cronbach's alpha, and the squared correlations among the model's variables.

Table (5) shows the outer loadings for each item and table four shows the cross loadings. By examining those tables based on the criteria mentioned above, it can be confirmed that the validity reliability of the measurement model has been established and we can proceed to examine the structural model.

	App	Att	BI	GoalCmt	ImpCmt	LMX	PBC	PEOU	PU	SupInf	Valence
App	0.8982										
Att	0.7813	0.9046									
BI	0.546	0.6456	0.8888								
GoalCmt	0.6916	0.7642	0.775	0.8915							
ImpCmt	0.4171	0.4162	0.4873	0.5346	0.8044						
LMX	0.1707	0.1974	0.1922	0.2119	0.2572	0.83831					
PBC	0.4587	0.5941	0.4297	0.5502	0.3787	0.0963	0.8655				
PEOU	0.5396	0.5451	0.4159	0.5738	0.3412	0.1373	0.7257	0.8666			
PU	0.7274	0.7327	0.6363	0.7127	0.3717	0.1967	0.4235	0.5529	0.8877		
SupInf	0.4963	0.5112	0.6869	0.5747	0.5166	0.3259	0.3394	0.3311	0.5109	0.8744	
Valence	0.7991	0.7932	0.6721	0.8033	0.5076	0.2764	0.5158	0.554	0.8058	0.5709	0.8823

Table 4: Correlation Matrix (Square Root of AVE on the diagonal).

	Cronbach Alpha		Appo	Att	BI	GoalCont	Impclint	LNK	F
	0.92	Appo	1						
	0.889	Att	0.6104	1					
	0.8667	BI	0.2981	0.4168	1				
	0.8707	GoalCont	0.4783	0.594	0.6006	1			
	0.8632	Impclint	0.174	0.1732	0.2375	0.2837	1		
	0.9301	LNK	0.0291	0.039	0.0369	0.0449	0.0631	1	
	0.865	PBC	0.2104	0.353	0.1846	0.3027	0.1434	0.0033	
	0.8347	PEOU	0.2912	0.2571	0.173	0.3232	0.1164	0.0185	0.5
	0.8659	PU	0.5291	0.5368	0.4049	0.5079	0.1331	0.0337	0.1
	0.8464	Support	0.2463	0.2613	0.4728	0.3302	0.2638	0.1082	0.1
	0.8572	Valence	0.6386	0.6292	0.4517	0.6452	0.2576	0.0794	0.1

Table 5: The Composite reliability, AVE, Cronbach's alpha, and the squared correlations.

	App	Att	BI	GoalCmt	ImpClmt	LMX	PBC	PEOU	PU	SupInf	Valence
Appr1	0.9183	0.7416	0.5016	0.6165	0.3607	0.1759	0.4306	0.4755	0.6861	0.3872	0.7249
App2	0.9105	0.7073	0.5052	0.6795	0.43	0.1555	0.4507	0.526	0.671	0.4793	0.7528
App3	0.8652	0.6509	0.4347	0.5595	0.2763	0.0829	0.3045	0.4385	0.5635	0.3974	0.6215
App4	0.898	0.7034	0.5167	0.6265	0.4259	0.193	0.4544	0.4972	0.6863	0.5201	0.7664
Att1	0.7542	0.9108	0.5463	0.7093	0.3212	0.1345	0.5836	0.5736	0.6824	0.4343	0.7321
Att2	0.6518	0.8877	0.6257	0.6868	0.4307	0.3084	0.4932	0.4469	0.6711	0.5269	0.7425
Att3	0.7109	0.9153	0.5835	0.677	0.3821	0.0977	0.5324	0.4534	0.6343	0.4291	0.6779
GoalCmt1	0.4762	0.6201	0.6751	0.8601	0.5047	0.1847	0.4489	0.4308	0.565	0.4813	0.6474
GoalCmt2	0.6311	0.6766	0.7388	0.9022	0.4704	0.2111	0.5187	0.5523	0.6313	0.5373	0.7172
GoalCmt3	0.733	0.7439	0.6583	0.9114	0.4578	0.1707	0.5014	0.5461	0.706	0.5166	0.7803
ImpClmt1	0.3664	0.3544	0.37	0.4133	0.8012	0.2421	0.2633	0.3204	0.3655	0.4091	0.4706
ImpClmt2	0.3505	0.3964	0.3945	0.4545	0.751	0.3127	0.3198	0.2265	0.2338	0.4734	0.4273
ImpClmt3	0.3669	0.3443	0.329	0.4167	0.8263	0.1575	0.2779	0.3069	0.3217	0.395	0.4178
ImpClmt4	0.2697	0.2796	0.4413	0.4268	0.7953	0.1152	0.3555	0.2632	0.2913	0.3857	0.3271
ImpClmt5	0.3225	0.2944	0.4194	0.4333	0.8454	0.1985	0.3014	0.259	0.2875	0.407	0.3967
BI1	0.5028	0.6257	0.9067	0.7301	0.4179	0.1836	0.3527	0.3336	0.5505	0.6034	0.6121
BI2	0.4957	0.5442	0.8482	0.6178	0.4041	0.1387	0.3641	0.366	0.5918	0.5991	0.5861
BI3	0.4599	0.5504	0.9101	0.7136	0.4758	0.1873	0.4282	0.4101	0.5587	0.6299	0.5947
LMX1	0.1447	0.1827	0.1347	0.1691	0.2088	0.8715	0.0659	0.0966	0.1762	0.2398	0.2451
LMX2	0.1213	0.1874	0.211	0.2184	0.3021	0.8068	0.1577	0.1476	0.155	0.3213	0.2542
LMX3	0.2088	0.1424	0.0832	0.134	0.2232	0.8139	0.0895	0.1161	0.1385	0.2878	0.2393
LMX4	0.1295	0.1825	0.1707	0.1908	0.2002	0.8721	0.0486	0.0501	0.1796	0.2627	0.2385
LMX5	0.1303	0.1463	0.1817	0.1075	0.1383	0.8326	-0.02	0.0372	0.1571	0.2902	0.1993
LMX6	0.199	0.1839	0.1466	0.2344	0.2389	0.875	0.1213	0.1855	0.1848	0.2832	0.2623
LMX7	0.1079	0.1113	0.1325	0.165	0.1794	0.792	0.1023	0.1942	0.1553	0.1999	0.1788
PBC1	0.4027	0.5144	0.3748	0.5251	0.3111	0.1028	0.8656	0.6018	0.377	0.311	0.4355
PBC2	0.3914	0.514	0.3689	0.4273	0.3443	0.064	0.8654	0.6544	0.356	0.2764	0.4573
PEOU1	0.4976	0.5305	0.4091	0.537	0.3592	0.0504	0.6452	0.8662	0.5034	0.2816	0.487
PEOU2	0.4426	0.3853	0.2768	0.4513	0.2764	0.1471	0.6298	0.8822	0.4146	0.2722	0.4199
PEOU3	0.4571	0.4878	0.3832	0.4953	0.2439	0.1675	0.6092	0.8514	0.5109	0.3056	0.5267
PU1	0.6664	0.706	0.6147	0.6912	0.3075	0.1498	0.3818	0.4762	0.9015	0.5221	0.7808
PU2	0.6982	0.6549	0.5949	0.6172	0.35	0.1528	0.3476	0.4826	0.9	0.4598	0.6734
PU3	0.5645	0.5809	0.473	0.5819	0.3362	0.2302	0.4026	0.5202	0.8612	0.3652	0.6863
SupInf1	0.5158	0.5443	0.6349	0.5949	0.463	0.417	0.3636	0.3681	0.5186	0.9018	0.5815
SupInf2	0.4471	0.4562	0.6323	0.5318	0.5175	0.1614	0.284	0.3161	0.4823	0.8773	0.5401
SupInf3	0.3221	0.321	0.525	0.3586	0.3617	0.2758	0.233	0.1642	0.3197	0.8432	0.3535
Valence2	0.7925	0.7016	0.4887	0.6279	0.3508	0.2415	0.4143	0.4723	0.71	0.4728	0.8628
Valence3	0.7788	0.7525	0.6365	0.7494	0.4777	0.2288	0.5079	0.5182	0.8006	0.5185	0.9315
Valence4	0.557	0.646	0.6386	0.7376	0.5009	0.2617	0.4369	0.4739	0.6219	0.5158	0.8505

Table 6: Items' Loading and Cross Loadings

Structural Model Evaluation:

After establishing the reliability and the validity of the measurement model, the structural model is examined and assessed. Hair et al. (2013) proposes a procedure for assessing the structural model:

- 1- Assessing the structural model for collinearity issues.
- 2- Assessing the significance and relevance of the model's relationships.
- 3- Assessing the Levels of R^2 .
- 4- Assessing effect sizes f^2 .
- 5- Assessing the predictive relevance Q^2 and the q^2 effect sizes.

As mentioned earlier, PLS-SEM differs from CB-SEM in that it doesn't have a global GOF measure, but instead is evaluated based on how well the model predicts endogenous variables.

Assessing the Model's Collinearity:

To assess the model for Collinearity issues, the sets of predictor constructs are examined separately. That is, each group of variables predicting another endogenous variable is tested as a set. Thus for this study's research model three sets of variables are tested for collinearity. The first set is (App, PU, PBC) predicting Att, the second set is (Att,PEOU,Val,ImpClmt) predicting GoalCmt, and the third set is (GoalCmt, SupInf) predicting BI.

To test for collinearity, the Hair et al.(2013) process has been followed. First, the latent variables scores produced by SmartPLS 2.0 were imported to SPSS. After importing the data, three regressions were run, one for each set of variables. The results shown in table (6) indicate that all VIF values are below the 5 threshold and tolerance scores are all above (.2).

Collinearity Assessment								
First Set			Second Set			Third Set		
Constructs	Tolerance	VIF	Constructs	Tolerance	VIF	Constructs	Tolerance	VIF
App	0.443	2.256	Att	0.355	2.819	GoalCmt	0.67	1.493
PU	0.461	2.171	PEOU	0.659	1.518	SupInf	0.67	1.493
PBC	0.772	1.295	Val	0.319	3.134			
			ImpClmt	0.737	1.357			

Table 7: Collinearity Assessment

Assessing the Significance and Relevance of the Model's relationships (Paths):

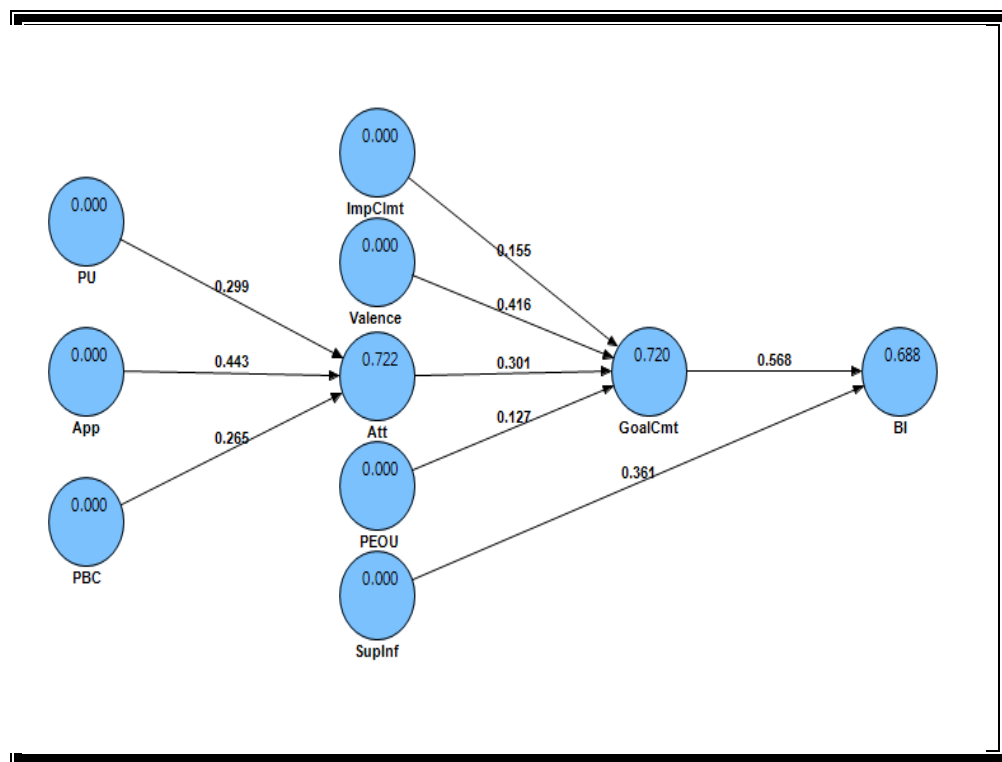


Figure 11: Path Coefficients and R² after running the PLS Algorithm

Figure (11) above shows the model's path coefficients and R² values for the dependent variables after running the PLS algorithm using the software SmartPLS 2.0. To assess the significance of the paths, a bootstrapping procedure was used with 5000 iterations (Hair et al. 2011). Since PLS doesn't assume that the data is normally distributed it employs the nonparametric bootstrapping "...which involves repeated random sampling with replacement from the original sample to create a bootstrap sample, to obtain standard errors for hypothesis testing. The process assumes that the sample distribution is a reasonable representation of the intended population distribution." (Hair et al., 2011). Figure (12) below shows the bootstrapping results for the model's relationships. The

numbers along the paths represent t-values which are presented along with the p-value and their significance in the table that follows.

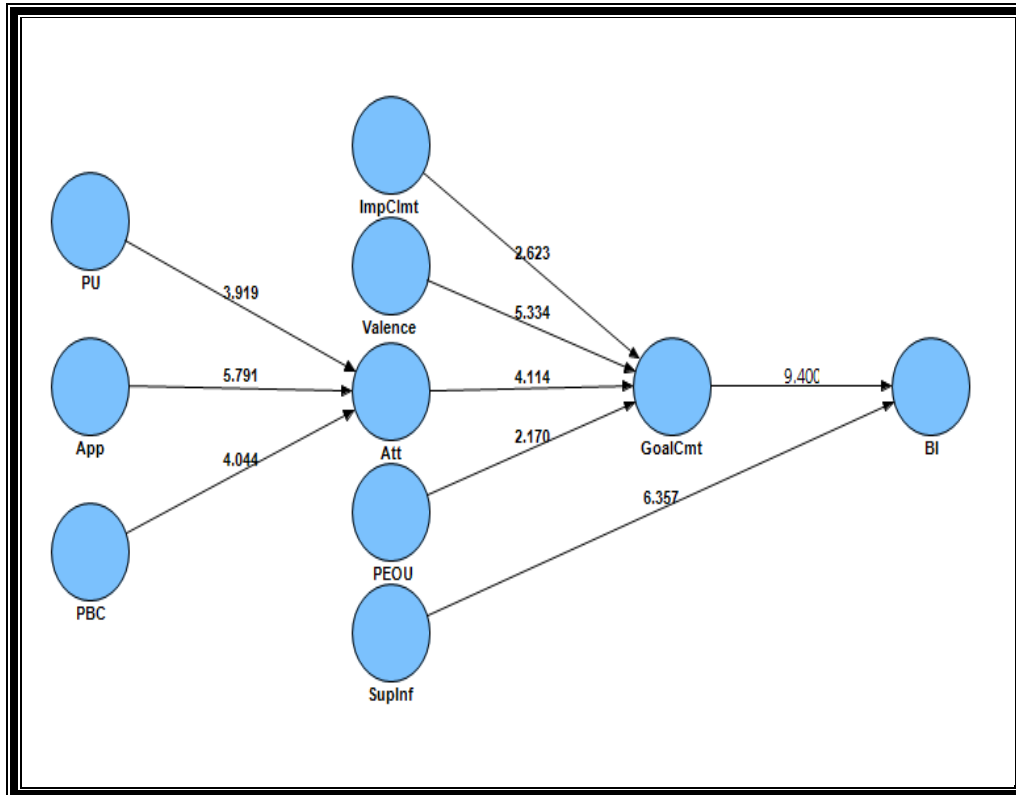


Figure 12: The Bootstrapping results (t-values).

Path	Path Coefficient	t-value	p-value(two-Tailed)	Sig.
PU-Att	0.299	3.948	0.0001	***
App-Att	0.443	5.854	0.00000003	***
PBC-Att	0.265	4.086	0.00007	***
ImpCmt-GoalCmt	0.155	2.649	0.008	***
Valence-GoalCmt	0.416	5.366	0.0000003	***
Att-GoalCmt	0.301	4.188	0.00004	***
PEOU-GoalCmt	0.127	2.151	0.03	**
GoalCmt-BI	0.568	9.104	0	***
SupInf-BI	0.361	6.167	0.00000001	***
** p < .05. *** P < .01.				

Table 8: Paths, Path Coefficients, t-values, p-values, and significance.

Path	Path Coefficient	t-value	p-value(two-tailed)	Sig.
App -> BI	0.0756	3.2777	0.0013	***
App -> GoalCmt	0.1331	3.6032	0.0004	***
Att -> BI	0.1707	3.6122	0.0004	***
ImpClmt -> BI	0.0881	2.7037	0.0076	***
PBC -> BI	0.0452	2.8784	0.0045	***
PBC -> GoalCmt	0.0795	3.0776	0.0024	***
PEOU -> BI	0.0718	1.9846	0.049	**
PU -> BI	0.051	2.3887	0.0181	**
PU -> GoalCmt	0.0898	2.5418	0.012	**
Valence -> BI	0.2363	4.4803	0.00001	***
** p < .05. *** P < .01.				

Table 9: Total Effects.

Assessing the Predictive relevance of the Model:

Stone-Geisser's Q^2 (Geisser 1974; Stone 1974) is used to assess the model's predictive relevance. Q^2 is built upon the premise that the model must "...be able to adequately predict each endogenous latent construct's indicators. The Q^2 value is obtained by using a blindfolding procedure, a sample reuse technique that omits every d th data point part and uses the resulting estimates to predict the omitted part." (Hair et al., 2011).

Blindfolding is applied to the model's dependent variables. Cross validated redundancy and cross validated communality values are obtained from running the blindfolding procedure. It is recommended to use the cross validated redundancy as the appropriate value for deciding on the model's predictive relevance. The CVR value is dependent on PLS's estimate for the measurement and structural model which makes it the most suitable measure for predictive

relevance. As a rule of thumb, a CVR value larger than zero means that the model has predictive relevance (Hair et al. 2011).

The final phase of the structural model assessment is to calculate effect sizes f^2 and q^2 . The f^2 is calculated for each independent variable that has a path to an endogenous latent variable (i.e. dependent variable). To do this we need two values which are: R^2_{included} which is obtained from running the PLS algorithm for the overall model with all the variables included, and R^2_{excluded} which is obtained from run. The effect size is then calculated according to this formula:

$$f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}}$$

This process is repeated for each independent variable and all the sets of models within the overall model. The same process applies to calculating q^2 . The rule of thumb for evaluating and interpreting R^2 values are: values of .25, .50, and .75 are described respectively as weak, moderate, and substantial. As for the effect size f^2 and q^2 , values of .02, .015, and .35 are described respectively as the independent variable having a small, moderate, or large effect on an endogenous dependent variable.

The tables below present the results for the structural model evaluation:

Dependent Variable	R ²	Q ²
Attitude	0.722	0.5862
Behavioral Intention	0.688	0.54
Goal Commitment	0.72	0.555

Table 10: R² and Q² Values for the dependent variables

Ind. Var.	Attitude		
	Path Coefficient	f ² Effect Size	q ² Effect Size
PU	0.299	0.1475	0.0821
App	0.443	0.3129	0.1908
PBC	0.265	0.1942	0.1063

Table 11: Attitude Evaluation

Ind. Var.	Goal Commitment		
	Path Coefficient	f ² Effect Size	q ² Effect Size
ImpCmt	0.155	0.0643	0.0202
Valence	0.416	0.2	0.0966
Att	0.301	0.1179	0.0539
PEOU	0.127	0.0393	0.0157

Table 12: Goal Commitment Evaluation

Ind. Var.	Behavioral Intention		
	Path Coefficient	f ² Effect Size	q ² Effect Size
GoalCmt	0.568	0.6891	0.3804
SupInf	0.361	0.2756	0.1478

Table 13: Behavioral Intention Evaluation

The moderated model:

For the purposes of simpler presentation and less model complexity the moderated model is presented separately. The main idea for testing this moderated model is look at the effects of supervisor influence as the main social influence variable affecting the study's variables. The LMX variable represents the moderating variable in testing those hypothesized relationships.

A moderating variable is one that affects the strength of the direct relationship between an independent variable and a dependent variable. A moderating variable can either be categorical (e.g. Gender) or continuous (e.g. LMX).

Henseler and Fassott (2010) recommend using the product indicator approach to test for moderating effects. They argue that this approach offers better results than the group comparison approach especially when the moderating variable is continuous. They advise that the group comparison approach, which involves comparing two groups of observations that are split from the whole sample based on certain criteria, only be used when the moderating variable is categorical. In the context of this study, applying the group comparison approach would involve splitting the sample to two groups based on the LMX score and having Low-LMX and High-LMX groups. Chin et al. (2003) argue that the product term approach provides better estimates of the interaction effects through

accounting for measurement error which could affect the strength of the relationship negatively, thus making it less “detectable”.

For the product term approach, if independent variable X has two indicators (i.e. measurement items) and the moderator variable has two indicators, the product term will have four product indicators. Within SmartPLS 2.0, this process is simple and involves the use of the (Create Moderating Effect) function which produces the Product term for the interaction effect. After the interaction term is created, the PLS algorithm is run again to obtain the path coefficient for the product term and the explained variance with the interaction term included. The significance of the interaction effect is tested using the same Bootstrapping procedure applied before. The results for testing the moderated relationships are presented in the table (13) below. A more thorough discussion and graphs of the moderated model is presented in the discussion chapter.

Interaction Term	Dependent Variable	Path Coefficient	t-value	Sig.	R2 without Interaction Term	R2 with Interaction Term	Effect Size
SupInf*LMX	BI	0.098	1.997	**	0.688	0.699	0.036
Att*LMX	GoalCmt	-0.185	2.268	**	0.727	0.75	0.092
SupInf*LMX	GoalCmt	0.031	0.72	ns	0.726	0.728	ns
SupInf*LMX	Att	-0.012	0.355	ns	0.726	0.726	ns
SupInf*LMX	PBC	0.131	2.153	**	0.117	0.134	0.02
SupInf*LMX	App	0.272	4.705	***	0.252	0.325	0.11
SupInf*LMX	PU	0.198	3.207	***	0.266	0.304	0.054
SupInf*LMX	Val	0.236	3.65	***	0.34	0.395	0.09
SupInf*LMX	ImpClmt	0.114	1.809	ns	0.282	0.294	ns
SupInf*LMX	PEOU	0.117	2.727	***	0.117	0.148	0.036

Table 14: PLS results for the moderated relationships.

Research Question 1: In a mandatory adoption environment, and specifically in the pre-implementation phase, what are the variables that are expected to influence and explain employees' Attitudes toward adopting and using the system upon its rollout?	Hypothesis Supported
<i>Hypothesis 1a: Perceived Usefulness (PU) will exert a positive influence on Attitude (Att).</i>	Yes
<i>Hypothesis 1b: Appropriateness (App) will exert a positive influence on Attitude (Att).</i>	Yes
<i>Hypothesis 1c: Perceived Behavioral Control (PBC) will exert a positive influence on (Att).</i>	Yes
Research Question 2: In a mandatory adoption environment, and specifically in the pre-implementation phase, what are the variables that are expected to influence and explain employees' commitment toward the goal of adopting and using the system upon its rollout?	
<i>Hypothesis 2a: Implementation Climate (ImpCmt) will exert a positive influence on Goal Commitment (GoalCmt).</i>	Yes
<i>Hypothesis 2b: Valence (Val) will exert a positive influence on Goal Commitment (GoalCmt).</i>	Yes
<i>Hypothesis 2c: Attitude (Att) will exert a positive influence on Goal Commitment (GoalCmt).</i>	Yes
<i>Hypothesis 2d: Perceived Ease of Use (PEOU) will exert a positive influence on Goal Commitment (GoalCmt).</i>	Yes
Research Question 3: In a mandatory adoption environment, and specifically in the pre-implementation phase, what are the variables that are expected to influence and explain employees' intentions toward adopting and using the system?	
<i>Hypothesis 3a: Goal Commitment (GoalCmt) will exert a positive influence on Behavioral Intention (BI).</i>	Yes
<i>Hypothesis 3b: Supervisor Influence (SupInf) will exert a positive influence on Behavioral Intention (BI).</i>	Yes
Research Question 4: In a mandatory adoption environment, and specifically in the pre-implementation phase, what role does LMX play in moderating the relationship between Supervisor Influence and the Model's Variables?	
<i>Hypothesis 4a: LMX moderates the relationship between Supervisor Influence (SupInf) and Behavioral Intention (BI); among higher quality exchanges a stronger SupInf-BI relationship is expected.</i>	Yes
<i>To explore the role of attitude in predicting Goal Commitment among different quality exchange it is hypothesized that:</i> <i>Hypothesis 4b: LMX moderates the relationship among Attitude (Att) and Goal Commitment (GoalCmt); the higher the quality of the exchange the lower the Att-GoalCmt relationship will be. (Among Lower quality exchanges, Attitude plays a bigger role in influencing their</i>	Yes
<i>Hypothesis 4c: LMX moderates the relationship between Supervisor Influence (SupInf) and Goal Commitment (GoalCmt); among higher quality exchanges a stronger SupInf-GoalCmt relationship is expected.</i>	No
<i>Hypothesis 4d: LMX moderates the relationship between Supervisor Influence (SupInf) and Attitude (Att); among higher quality exchanges a stronger SupInf-Att relationship is expected.</i>	No
<i>Hypothesis 4e: LMX moderates the relationship between Supervisor Influence (SupInf) and Perceived Behavioral Control (PBC); among higher quality exchanges a stronger SupInf-PBC relationship is expected.</i>	Yes
<i>Hypothesis 4f: LMX moderates the relationship between Supervisor Influence (SupInf) and Appropriateness (App); among higher quality exchanges a stronger SupInf-App relationship is expected.</i>	Yes
<i>Hypothesis 4g: LMX moderates the relationship between Supervisor Influence (SupInf) and Perceived Usefulness (PU); among higher quality exchanges a stronger SupInf-PU relationship is expected.</i>	Yes
<i>Hypothesis 4h: LMX moderates the relationship between Supervisor Influence (SupInf) and Valence (Val); among higher quality exchanges a stronger SupInf-Val relationship is expected.</i>	Yes
<i>Hypothesis 4i: LMX moderates the relationship between Supervisor Influence (SupInf) and Implementation Climate; among higher quality exchanges a stronger SupInf-ImpCmt relationship is expected.</i>	No
<i>Hypothesis j: LMX moderates the relationship between Supervisor Influence (SupInf) and Perceived Ease of Use; among higher quality exchanges a stronger SupInf-PEOU relationship is expected.</i>	Yes

Table 15: Summary of the hypotheses testing results

Summary:

This chapter presented the sample and the context of the study. It described the sampling procedure and survey refinement process. It also provided the demographics of the participants. Additionally, it presented the results of our descriptive analysis, reliability and validity tests. Partial least squares PLS-SEM was chosen to test the research model and hypotheses.

The Structural model evaluation using PLS analysis showed that the research model demonstrated sufficient convergent, discriminant validity, and sufficient reliability for the constructs' measures. The results of the analysis provide support for all of the hypotheses except three in the moderated model which was tested separately.

The theoretical and practical implications of the findings and a thorough presentation of the results is presented in the next chapter.

CHAPTER 5:

DISCUSSION AND FINDINGS:

The major goal for this study is to explore and understand the technology acceptance phenomenon in a mandatory pre-implementation environment within an organization. Another major goal is to explore the role that the employees' supervisor has in affecting the employees' direct beliefs, attitudes, and ultimately their behaviors. The introduction of LMX, as a moderating variable between Supervisor Influence and the study's variables, is aimed at better understanding how the quality of the relationship between the employees and their direct supervisors affect their overall acceptance of the new technology being introduced in the work place. This chapter discusses the study findings and the implications of those findings on the introduction of a new technology into the workplace. It also presents the study's limitations and future research suggestions.

The technology acceptance phenomenon has been studied extensively within the IS field, however, a study within such a context where acceptance is mandatory and at the pre-implementation stage is lacking. This research is conducted with the goal of answering four major research questions within such context. Those questions guide the hypotheses development and allow for exploring the nature of the relationships between the study's variables and how they differ in this context from other contexts that have been examined before in the literature. The first three questions were mainly concerned with predicting and explaining the variance of the study's dependent variables: Attitude, Goal

Commitment, and finally Behavioral Intention. The fourth question is aimed at exploring the role and the effect of the moderating variable LMX on the relationship between the main social influence variable of the study, Supervisor Influence, and the study's variables.

This study presents a theoretical model tested using the PLS-SEM technique. The model is based on research findings from the leadership, change management, and technology acceptance literatures. Those literatures guided the model building process and helped identify the variables of interest for the context of this study.

One of the main strengths of this study is the nature of the sample and the response rate. This study is conducted in an organizational setting where a new Content Management System is being implemented. With 148 usable surveys of the 200 prospective participants to which the survey is sent, the study has had a response rate of 74%. Furthermore, 86% of the participants were 30 years of age or older and has been working at the university for two or more years. Also, 95% of the survey participants held a bachelor degree or a higher graduate degree. For example, the use of student samples has been found to affect the findings of research on technology acceptance (Schepers &Wetzels, 2007).

Major Findings:

One of the study's major findings is that it reveals a relatively different pattern of relationships between the variables within the context of this research. The richer model is able to capture and explain a significant amount of the explained variance for the study's major dependent variables. It further shows that the relationships between those variables might depend on the contextual factors that this study is conducted under. The mandatory nature of the context and the pre-implementation stage at which data is collected might help guide technology implementations of similar nature. Next is a discussion of the results for this study as it relates to the major dependent variables in the research model. The discussion of the findings is ordered as per the research questions this study aims at answering. The first part will discuss the Attitude construct and its accompanying hypotheses. The second part will look at Goal Commitment and its predictors. The third part of the discussion will focus on predicting Behavioral Intention. This will be followed by a discussion of the moderated model and the role of LMX as a moderating variable. A discussion of the TAM and its variations' performance within the context of this study follows. And finally, the limitations of this study are presented.

Attitude:

Research in the technology acceptance literature has found that the relationship between Perceived Usefulness (PU) and Behavioral Intention (BI) to be the most consistent among the TAM's relationships. This fact along with the

instrumentality premise which is discussed earlier has led to the removal of the Attitude construct from the Original Technology Acceptance Model. This research has found that the pattern of relationship between Perceived Usefulness and both of the Attitude and Behavioral intention to be different. PU is found to be a significant predictor of Attitude, thus supporting hypothesis 1a. Furthermore, PU has a moderate effect size (.15) on explaining Attitude's variance (R^2). It also has a relatively weak impact of predictive relevance (q^2) on Attitude's Q^2 which is equal to (.08). To further verify the findings, the direct relationship between PU and BI without any mediating variables is tested and found to be non-significant, and the path coefficient for the total effect of PU on BI via the mediating variable is small(.05).

These finding suggest that beliefs about the usefulness of the new Content Management System play a different role from the one usually found in other settings. Beliefs about the usefulness of the system may play a role in forming the attitude about using the new system, but it has no significant effect of the intention to use the system at this early stage. The implication of this finding is that while PU didn't affect the BI, it is important for implementers, at this pre-implementation stage, to emphasize the usefulness of the new system and its role in increasing the users' performance and effectiveness.

Testing the model reveals that Appropriateness (App) has a significant effect on Attitude, thus supporting hypothesis 1b. Appropriateness, as a variable

within the context of this study, is aimed at capturing the end users' perceptions about how the new system will improve the performance of the organization as a whole and, obviously how appropriate it is, given the context and the need. Appropriateness has a relatively moderate to strong effect size (.31) on explaining Attitude's Variance; twice the effect of PU on Attitude. Additionally, Appropriateness has a moderate impact of predictive relevance on Attitude's Q^2 . This finding suggests that end users' perception about the appropriateness of the system being implemented plays a significant role in forming their attitudes about their future use of the technology.

The earlier discussion of similar constructs such as compatibility (e.g. Moore & Benbasat, 1991; Agarwal & Prasad, 1997; Karahanna et al., 1999), which is more specific and is concerned with capturing the personal aspects of the construct, offers an insight on how to explain this finding. Variables such as compatibility are more appropriate when an actual interaction and use has occurred between the users and the system. At earlier stages such as the pre-implementation stage, messages about the appropriateness of the new system will have a favorable effect on the attitudes of end users. However, as the project progresses, the content of the "appropriateness" message must become more personal and at the end users' level.

Perceived Behavioral Control (PBC) is found to have a significant effect on Attitude as well, thus supporting hypothesis 1c. PBC has a moderate effect size

of (.19) on explaining the variance of Attitude and a small effect size of impact of predictive relevance on Attitude's Q^2 . Users' perception about the availability of resources and the ability to acquire the knowledge necessary to use the system influence their attitudes toward using the system. This finding suggests that having resources such as time and training that focuses on enhancing the skills of prospective users will have a positive effect on how they view their system use in the future (e.g. Brown et al., 2002).

Jointly, the three variables (PU, App, and PBC) explain a relatively large portion of Attitude's variance (72%). Of the three variables, Appropriateness displayed the strongest effect size. This finding highlights the importance of communications that emphasize the appropriateness of the system being implemented (Armenakis & Harris, 2002). It further points to the importance of communicating the "choice" process of the new system and the main decision drivers which led to choosing the specific system. Messages that signal that choosing SharePoint 2010 is based on an informed decision making process increases the confidence of the end users in the appropriateness of the system and ultimately will have a positive effect on their attitudes toward using the system. The long planning and preparation period of the project appears to have helped in creating a positive attitude among end users. This period involved regular communications and workgroups meetings which appear to have increased the end users' confidence in the appropriate choice of the system, the availability of resources, and its usefulness.

Goal Commitment:

Goal commitment is introduced in the research model for several purposes. Firstly, it attempts to overcome the inconsistent, and in many cases, the non-significant relationship between Attitude and Behavioral Intention. Secondly, Bagozzi (2007) in his critique of the technology acceptance literature introduced a new paradigm for understanding the process of technology acceptance. The paradigm presents the concepts of goal desire and goal intention as predecessors to action desire and action intention.

As the second dependent variable within the research model, support has been found that end users' perceptions about the implementation climate within the organization have a significant effect on their Goal Commitment, thus supporting hypothesis 2a. However, the effect size of Implementation climate on explaining the variance of Goal Commitment is relatively small (.06), so is its impact of predictive relevance (.02). This finding suggests that while the relationship is significant, end users didn't attach as much value to their beliefs about the implementation climate when it came to committing to using the system. Their perceptions of the extent to which their use of an innovation is supported, rewarded and expected, at this stage of the project, might merely reflect their evaluation of the policies and procedures that they have experienced thus far. This evaluation might also present the outcomes of the attentional process, which is discussed earlier, resulting from social influence and interaction regarding the implementation project. As a construct trying to capture the

effectiveness of the overall policies and procedures undertaken during the implementation project, implementation climate provides signals about the success of those policies and offer an opportunity for corrective action at earlier stages of the project.

Valence is the second variable which influences Goal Commitment is, thus supporting hypothesis 2b. As explained earlier, valence captures the end users' perception about the benefits (intrinsic and/or extrinsic) they will reap from the change to the new system. Valence's effect size on explaining the R^2 of Goal Commitment is moderate (.2) but its impact of predictive relevance is small (.1). Of the four variables hypothesized to influence Goal Commitment, Valence had the highest path coefficient, f^2 , and q^2 values. This highlights the importance of end users' beliefs about the personal benefits they will gain from implementing the new system. Previous research in the change management field has shown that valence plays an important role in creating readiness for change and for positively impacting commitment to change (Armenakis & Harris, 2002; Armenakis et. al., 2007; Weiner, 2009). This research's operationalization of valence is aimed at capturing the personal value that end users attach to the change to the new system. Such value appraisal process will ultimately differ from one person to another (Weiner, 2009). Some end users may value the increased performance while others may value the added capabilities and functions the system will provide such as having more control over content. Other users might attach value to supporting the project and its effects on the brand of the institution. It is also

plausible that some end users will value the change to the new system based on their supervisors' support of the implementation project.

Attitude has been also found to significantly affect goal commitment, thus providing support for hypothesis 2c. Attitude towards and "attractiveness" of certain behaviors has been shown to influence Goal Commitment (Hollenbeck & Klein, 1987). End users' evaluation of the change to the new system from an attitudinal perspective is a reflection of how they "feel" about the change. This affective appraisal process, through influencing goal commitment, might reflect a desire to be committed to the change. Meyer and Herscovitch (2001), in their model of commitment, suggest that such "desire" and affective appraisal might be rooted in identity relevance, shared values, and/or, personal involvement. The implication is that such root for commitment is more desirable, as it represents a personal investment in the change that goes beyond rewards and/or punishments. The finding that Valence's effect size on Goal Commitment is almost twice the effect of attitude suggests that end users might be basing their goal commitment more on a normative basis than affective ones. Meyer and Herscovitch (2001) argue that a sense of obligation rooted in benefits' reciprocation and socialization form this kind of normative goal commitment.

The least influential variable on Goal Commitment is Perceived Ease of Use (PEOU). Even though support is found for its influence on Goal Commitment, PEOU effect size on explaining its Variance is very small (.03) and

its impact of predictive relevance on Goal Commitment's Q^2 is negligible. This finding is different from patterns found in previous research where PEOU is found to be more influential early in technology implementation projects (e.g. Karahanna et. al., 1999). What this suggests, is that, users might be more comfortable with using the technology and/or are experienced in similar systems. Furthermore, one of the reasons that SharePoint 2010 is chosen because its interface is similar to other applications which are already in use at the organization. Thus, the end users' familiarity with the Microsoft platform/interface might explain the small effect size of the variable.

Overall, the four variables explain a sizeable and significant 72% of Goal Commitment's variance. Valence, as mentioned earlier, had the biggest influence on Goal Commitment, with Attitude coming second, and Implementation Climate and Perceived Ease of Use coming third and fourth respectively. This pattern of relationships offers some insight for implementers. Beliefs about the personal benefits from the change play a significant role in having end users more committed to the system change/implementation process. Additionally, affective evaluations (i.e. Attitude) of the change to the new system, which are dependent on the previously discussed variables (Appropriateness, Perceived Usefulness, and Perceived Behavioral Control), are very important in creating the kind of commitment which is driven by "goal desire".

Behavioral Intention:

Behavioral Intention has been a staple dependent variable in technology acceptance studies and is grounded in both the Theory of Planned Behavior and the Theory of Reasoned Action. As the direct antecedent to the actual behavior, explaining and predicting Behavioral Intention provides implementers, especially at the pre-implementation stage, with the ability to early pay attention to variables that might influence use when the system is rolled out.

Goal Commitment strongly influences Behavioral Intention, thus supporting hypothesis 3a. The effect size of Goal Commitment in explaining Behavioral Intention's variance is very large (.69) and its impact of predictive relevance on Intention's Q^2 large (.38). Those findings highlight the importance of goal commitment as a predecessor to Behavioral Intention at the pre-implementation stage. In their presentation of a General Model of Workplace Commitment, Meyer and Herscovitch (2001) argue that commitment, as a binding force, has consequences on commitment-related behaviors. They further argue that, even when the commitment-related behavior is specific, people have some discretion on how to act. However, such behaviors will probably occur because of the binding nature of commitment which makes it different from other variables such as attitude. The implication from this finding is that more efforts should be directed at fostering goal commitment among end users, especially early in implementation projects.

Supervisor Influence also has a moderate effect size (.27) on Behavioral intention, thus supporting hypothesis 3b. Previous technology acceptance research introduced the direct effect of Subjective Norm as a representation of a compliance-effect process (Yi et. al, 2006; Schepers & Wetzels, 2007; Venkatesh & Davis, 2000). Compliance occurs in mandatory settings where the behavior can be rewarded and non-behavior be punished. This finding suggests that compliance with the supervisor played a significant role in predicting the intention to use the system.

Overall, both Goal Commitment and Supervisor Influence explain 69% of the Behavioral Intention's R^2 . Goal Commitment has more than twice the effect size of Supervisor Influence, a finding which highlights, that even in mandatory settings, emphasizing and working on influencing goal commitment at early stages of the project is a worthwhile endeavor. Such efforts will pay dividends as the project progresses in the form of more commitment-related behaviors that will ultimately affect the project positively. Additionally, the compliance effect, early at the project, might help some users, and ultimately the implementation project, avoid and overcome the initial hesitance and indifference or even mild forms of resistance to change. In other words, one can view the compliance effect positively as a "jump start" for some users.

LMX and its moderating role:

As mentioned earlier, one of the major drivers behind this research is to understand the role direct supervisors play in the end users' acceptance of the new system being introduced to the workplace. The introduction of LMX as a moderating variable will allow a better understanding of the identification, internalization, and compliance processes through which social influence is said to affect attitudes and beliefs. By focusing on the direct supervisor's influence, the quality of the relationship with him/her can be viewed as the lens and/or the conduit through which end users interpret that influence. This will offer an insight of how it affects their beliefs regarding their use of the new system.

Support is found for hypothesis 4a which postulates that LMX moderates the relationship between Supervisor Influence and Behavioral Intention. The compliance process which operates between Supervisor Influence and Behavioral Intention is moderated by the quality of the relationship between the end user and his/her supervisor. LMX strengthened the positive relationship between Supervisor Influence and Behavioral Intention for both lower and higher quality exchanges. From a quality of exchange perspective, end users with higher quality exchanges might view their acceptance of influence from their supervisors as a form of reciprocity and/or obligation which is not driven by mere compliance. For end users with lower quality exchanges, the acceptance of influence is either due to the lack of other options or to avoid punishment.

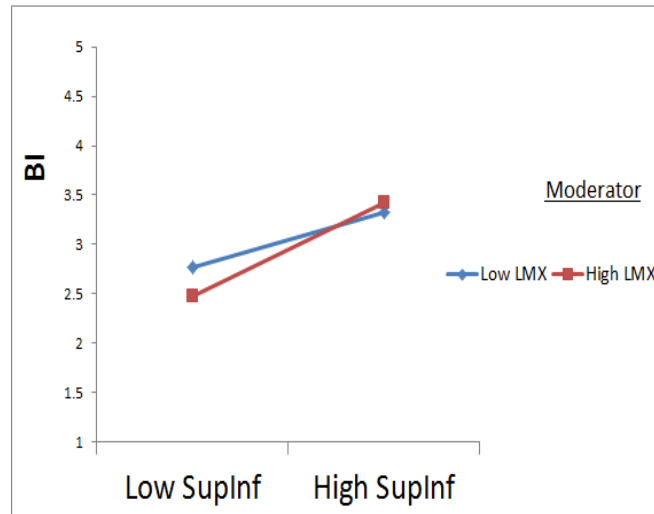


Figure 13: Graphical Model of Hypothesis 4a.

One of the more interesting findings of this research is the support found for hypothesis 4b which postulates that: LMX moderates the relationship between Attitude and Goal Commitment; the higher the quality of the exchange the lower the Attitude-Goal Commitment relationship will be. In other words, among lower quality exchanges, Attitude will have a bigger influence on Goal Commitment. The graph clearly shows that among higher quality exchanges, the influence of attitude on goal commitment is bordering a straight line; which means that LMX is weakening/dampening the relationship between Attitude and Goal Commitment. This suggests that end users with lower quality exchanges base their commitment more on how they feel about using the system (i.e. their attitude); their commitment to using the system is more “objective” and is less affected by the identification process which is more likely to influence end users with higher quality exchanges.

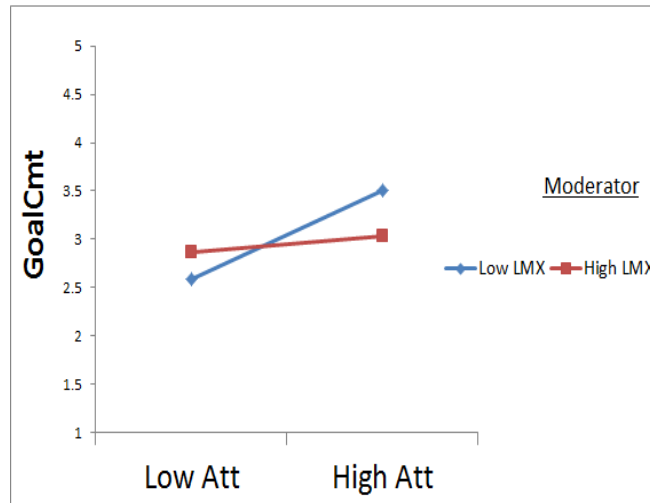


Figure 14: Graphical Model of hypothesis 4b

To further understand the process by which identification affects end users' acceptance of the new system, the moderating effect of LMX on the relationship between Supervisor Influence and both Goal Commitment and Attitude is tested. No support is found, thus the rejection of both hypotheses 4c and 4d. The relationship between Supervisor Influence and both variables without the moderator is also found to be non-significant. This finding suggests that the identification process through which social influence of the supervisor affects Attitude and Goal Commitment is not as direct as hypothesized. Through affecting other beliefs, as the support for the following hypotheses shows, both identification and internalization processes ultimately affect attitude and goal commitment indirectly. One might further argue that end users, regardless of the quality of the exchange they have with their direct supervisor, form their Attitude and Goal Commitment using a more complex process. Hollenbeck and Klein's (1987) Expectancy Theory Model of the antecedents and consequences of goal commitment offers some insight onto such process. They argue that Goal

Commitment is a function of both the attractiveness and expectancy of goal attainment, and that both attractiveness and expectancy of goal attainment are affected by a multitude of variables which can be classified to situational personal factors. This, combined with the fact that both variables in our research model are dependent variables influenced by other variables, suggests that forming one's attitude and commitment to a goal is subject to a more complex process influenced by other variables than supervisor influence. It also suggests that supervisor influence represents only one aspect of the overall social influence process which is the product of influence by a multitude of relevant others such as peers, top management, implementers, etc.

LMX is found to moderate the relationship between Supervisor Influence and Perceived Behavioral Control (PBC) by strengthening the relationship between the two, thus supporting hypothesis 4e. This finding is expected since employees who perceive that their supervisor supports their use of the new system expect that resources, such as time to train, will be provided and supported by their supervisor. This relationship is stronger for end users with higher quality exchanges. Such users have higher expectations from their supervisors based on the relationship they have.

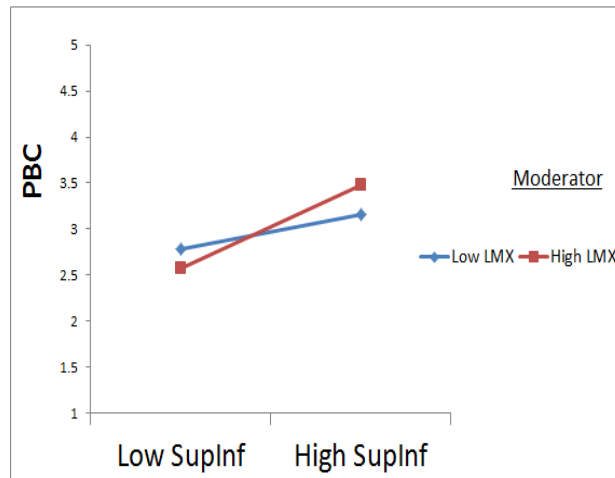


Figure 15: Graphical Model of hypothesis 4e

Support is found for hypothesis 4f which postulates that LMX moderates the relationship between Supervisor Influence and Appropriateness. Furthermore, of all the tested moderated relationships, this one had the highest effect size. Appropriateness has been introduced as a variable measuring the end users' perception about how suitable or "fit for the organization" the system is. Supervisor influence on this variable is suggested to operate through an identification process similar to the way subjective norm is hypothesized to affect image in TAM2. As the source of credible information, especially for end users with higher quality exchanges, the supervisor influenced beliefs about the appropriateness of the system to the organization. Social information process theory (Salancik & Pfeffer, 1978) also supports this finding; by relying on information from the social context, end users utilize those cues as guides which will ultimately affect and help shape their beliefs. Furthermore, communication between the supervisor and his/her direct employees, specifically with those enjoying a higher quality exchange, will have more influence in shaping their

perceptions about the appropriateness of the system and its effects on the issues like the brand of the organization.

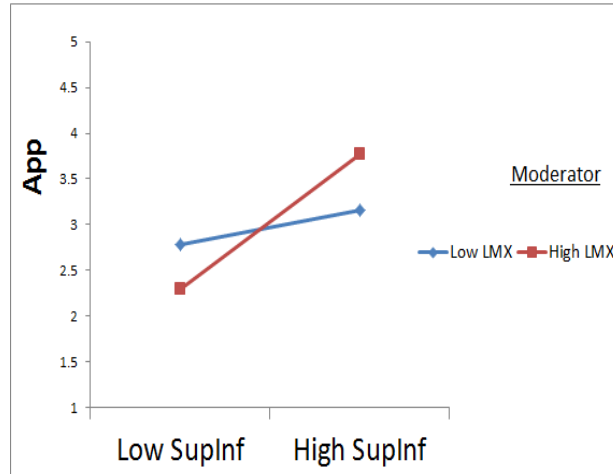


Figure 16: Graphical Model of hypothesis 4f

Support is also found for hypothesis 4g which postulates that LMX will moderate the relationship between Supervisor Influence and Perceived Usefulness. Previous research on technology acceptance (e.g. Schepers & Wezels, 2007; Venkatesh & Davis, 2000) found that, through internalization processes, subjective norm influences Perceived Usefulness. This research extends this finding by specifically identifying that such process is more prominent for end users who enjoy higher quality relationships with their supervisors. Through internalization, end users interpret information and cues from relevant and important others as indicative of reality. Building on what has been discussed about social information processing theory; one might further argue that this influence on usefulness beliefs is driven by directing attentional processes where the supervisor makes aspects about the usefulness of using the system more

salient to the end user. A higher quality exchange which is characterized by trust and open communication amplifies this internalization process.

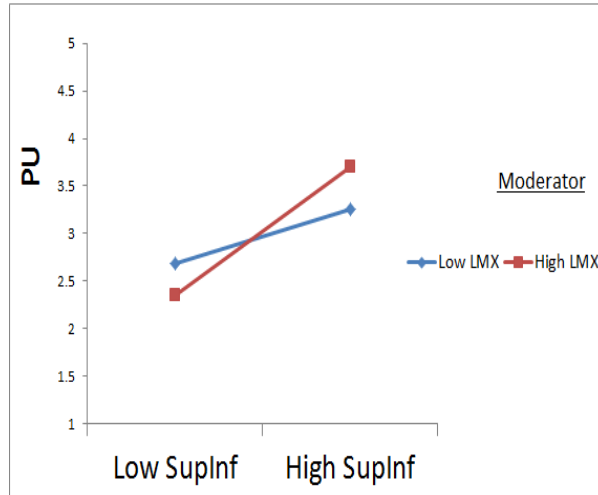


Figure 17: Graphical Model of hypothesis 4g

Hypothesis 4h which postulates that LMX will moderate the relationship between Supervisor Influence and Valence is supported. A higher Supervisor Influence and Valence relationship is found among end users with higher quality exchanges. This Finding is consistent with the previous findings of this study; through an identification process, especially among end users with higher quality exchanges, the supervisor influences and shapes their beliefs about the benefits they will personally gain from using the new system. For lower quality exchanges the acceptance of such influence by the supervisor might stem from his/her knowledge about the new system. It could also signal to those end users that their acceptance of the new system which their supervisor supports could help improve the quality of the exchange. Among higher quality exchanges, through their acceptance of this influence, end users are contributing and maintaining the

relationship. Furthermore, the direct supervisor has the power to provide tangible rewards and benefits.

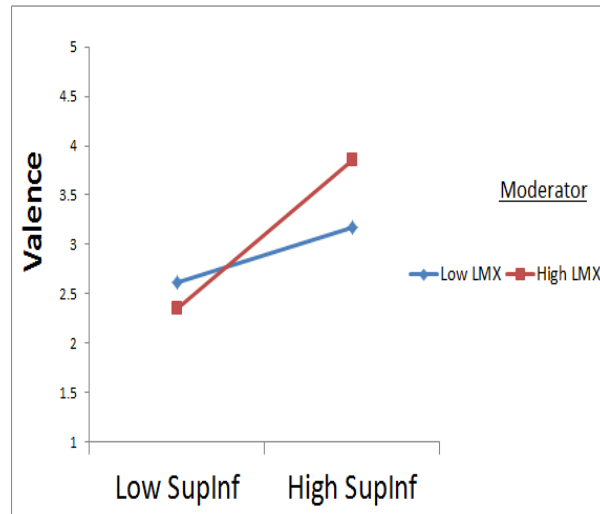


Figure 18: Graphical Model of hypothesis 4h

Hypothesis 4i which postulates that LMX moderates the relationship between Influence and Implementation Climate is not supported. The direct effect of supervisor influence on Implementation Climate without the moderating effect is significant, which suggests that supervisor influence affect end users' perceptions about the implementation climate within the organization. The lack of significance for the moderating effect might stem from the fact that, as mentioned earlier in the literature review, implementation climate represents an umbrella variable aimed at capturing the overall policies and procedures at the organization. As an umbrella variable, end users might view supervisor influence as one facet or aspect of the overall factors that influence their perceptions about the implementation climate for the project in the organization. Furthermore, this finding suggests their evaluation of the implementation climate within the

organization might be dependent on cues from multiple sources that go beyond the supervisor and the quality of the relationship they have with him/her. In such case LMX becomes less influential in interpreting those cues that come from multiple resources.

Finally, hypothesis 4j which postulates that LMX will moderate the relationship between Supervisor Influence and Perceived Ease of Use is supported. Building on what has been discussed with regards to the finding that LMX moderates the relationship between Supervisor Influence and Perceived Behavioral Control, a similar argument can be presented here. End users with higher quality exchanges might expect more resources made available by or through their supervisor for the purposes of making them skillful at using the new system. Additionally, through an internalization process, end users, especially those with higher quality exchanges, might take the influence attempts from their supervisor about the ease of using the system as cues to reality, thus perceiving the system to be easier to use. One might further argue that in higher quality exchanges, both parties share some characteristics, thus making this “similarity” a basis for influencing perception about one’s efficacy which will ultimately affect his/her perceptions about the ease of using the system.

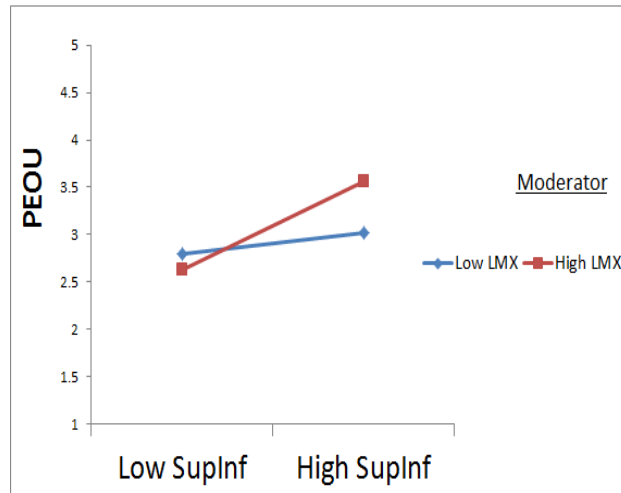


Figure 19: Graphical Model of hypothesis 4j

A Model Comparison:

As discussed earlier, Perceived Usefulness was found to have a different pattern of relationships with Attitude and Behavioral Intention (Hypothesis 1a). Perceived Usefulness, in the context of this study, was found to be a significant predictor of Attitude but not Behavioral Intention, thus providing support that the instrumentality premise which led to the removal of the Attitude construct “operates” differently.

To further establish the relevance of the Attitude construct and to explore the effects of introducing Goal Commitment on TAM, a model comparison was made. . By comparing alternative models according their explanatory relevance (i.e. R^2) and the change is path significance, if any; one can make statements whether the context of the study has an effect on the performance and the assumptions of the models.

The TAM was modeled and its relationships were analyzed. In the first step, the original TAM with the attitude construct was tested. In the next step, the TAM without the Attitude construct was tested. The final step involved introducing the variable Goal Commitment to the original TAM model. Since the goal of using PLS is to maximize the Variance Explained and thus judge the model based on its predictive ability, the results show that the TAM without the attitude construct performed the poorest from that perspective.

The parsimonious model without the attitude construct explained 41% of BI's Variance. On the other hand, the TAM model with the attitude construct performed better in predicting Behavioral intention, explaining 48% of its variance. Furthermore, and more importantly, the Attitude-Behavioral intention relationship was significant. The removal of the attitude construct from the Original TAM for parsimony purposes presents an incomplete picture and ignores the influence of this variable especially in the context of this study.

To assess the importance of the Attitude construct compared to PU in predicting behavioral intention one can calculate the effect size of each construct on the Behavioral intention. Using the same process described before in assessing the overall model, f^2 values for Attitude and PU were calculated. The f^2 for PU was (.107) while the f^2 for Attitude was (.135). These findings suggest that, in the context of this study and using the Original TAM model, the Attitude construct

has an effect size on Behavioral intention that is slightly higher than PU. The deletion of the Attitude construct does, in fact, present an incomplete picture.

Introducing the Goal Commitment variable to the Original TAM model not only increased the Behavioral Intention's explained variance to 62%, but also changed the strength of the model's relationships. The direct paths from PU to Behavioral intention ($t=1.727$) and from Attitude to Behavioral Intention ($t=.848$) became non-significant. Also the effect sizes for Goal Commitment, Attitude, and PU were (.37), (.005), (.023) respectively. Those findings suggest that the "instrumentality" assumption in the context of this study, to say the least, operates differently. Specifically, the PU-BI relationship which constitutes the basis of the instrumentality assumption became non-significant when Goal Commitment was introduced and its direct effect on Behavioral Intention borders negligibility.

Implications for practitioners:

This research's findings make several contributions to practice. First and foremost, this study highlights the important role of supervisors in influencing employees' acceptance of new technologies within the work place. Supervisors have the ability to influence their employees' beliefs with regards to the appropriateness and usefulness of the suggested IT solution at the pre-implementation stage. Having different levels of management involved early in IT implementation projects can help in reducing the uncertainty surrounding IT

related change efforts. Frequent communications and working groups that keeps management informed and up-to-date can help in maintaining a positive attitude toward using the system as those communications filter down the organizational hierarchy. When end users believe that the IT solution choice process is based on an educated and informed decision making process it will increase their confidence in the system and ultimately affect their attitude.

Furthermore, it is important to make sure the management within the organization provides resources such as time and training to maintain a positive attitude. Implementers need to emphasize to managers and supervisors the importance of providing such resources to all their employees. Maintaining a positive attitude throughout the implementation project and especially at the pre-implementation stage can foster the end users commitment to using the system. Creating such commitment will have positive ripple effects throughout the project and beyond. Furthermore, commitment that is based on attitudinal beliefs has more desirable consequences for the organization than other forms of commitment which might be based on reciprocity and/or rewards.

System implementers should also focus on managing the implementation process as multistage process where the influence of different variables on acceptance by end users varies between stages. Such approach will allow for a better diagnosis for potential problem areas. This diagnosis process can guide

corrective action if needed by allowing the implementation team to focus on the most relevant factors to end users.

Limitations and Future Research:

While this study offers new insights about the technology acceptance phenomenon at the pre-implementation stage in a mandatory environment, it is not without limitations. First, the sample for this study was drawn from a single organization (Educational) and for one system (Content Management). Additionally, the items measuring the study's variables were modified to reflect both the nature of the project (i.e. the system to be implemented) and its stage. As such the results of the study may not be generalizable to other contexts.

The second limitation is the use of self-reporting survey method to collect the data for the study. Measuring all variables in the same survey might raise the issue of common method bias, as such this bias can't be ruled out. Furthermore, for respondents, answering items measuring Perceived Ease of Use and Perceived Usefulness may have posed a challenge since they haven't interacted with the system yet. However, the fact that they could have been familiar with Content Management Systems in general and Microsoft products (i.e. interface) may have reduced that possibility. Another issue is the measurement of LMX which may have been also a challenge to respond to its items due to the sensitivity of the concept. Responding to items that "evaluate" the relationship with the supervisor may have been an issue for some respondents.

The third limitation is the cross-sectional nature of the study. Data was collected at one point in time during the project. Perceptions may change over time, thus causal inferences are hard to make. Additionally, the fact that the study collected data at the pre-implementation stage limits the ability to generalize the findings beyond that point. However, this study is exploratory in nature and attempts to understand the acceptance phenomenon at this stage. Data was not “historical” but was collected before system use, so “memory bias” is less of a concern.

The fourth limitation is the fact that this study looked at an institution wide system implementation. The magnitude of the project expands over multiple entities within the organization. From a contextual perspective, an entity-level analysis might have shown different results.

Finally, while the nature of the sample has been introduced as a strength of this research, it can also be a limitation. A majority of the sample worked at the university for more than two years and were thirty years of age or older. Also, near 70% of the sample held a Master’s degree or higher. The education aspect gives the sample more work mobility within the organization and beyond.

Future research could overcome many of these limitations by extending the study to more organizations and different systems. Furthermore, a longitudinal

study collecting data at multiple points of the project would offer deeper insights into the acceptance process as it relates to organizational change efforts. For example, data can be collected after the first training, after the last training, upon rollout, and after three months of usage.

Future research could also look into incorporating more organizational and contextual variables into acceptance models. The change management, social psychology, and leadership literatures are example of fields that can enrich and deepen our understanding of the technology acceptance phenomenon.

This study findings offer an opportunity to guide future research. For example, introducing organization-wide systems, such as SharePoint, which will be used throughout the university, can alter some of the existing organizational-based relationships. Research could look into how some users might embrace the technology as a mean to “escape” a low quality exchange they have with their supervisor. By acquiring such skills, those users might be able to move more “freely” within the organization. Additional research may also look at the effects of introducing such technologies on webmasters and within organizations. Systems such as SharePoint offer non-technical staff with the ability to author and publish content more easily than before, thus making them less dependent on IT staff.

Additionally, one of the major issues in the IS field is the lack of studies that look into moderating effects beyond the usual individual factors such as age and gender. This study looked at LMX as a moderating variable; the role of other moderating variables should be explored. This will allow for a better understanding of factors that affect the strength of the relationships between the variables of interest.

Conclusion:

The research model for this study was developed to answer the four major research questions which aim at understanding the technology acceptance phenomenon at the pre-implementation stage in a mandatory environment. The study also explored the role of the quality of the relationship between supervisors and employees as end users. The results uncovered a different pattern of relationships from that previously reported in the literature. It also highlighted to the role of LMX and supervisor influence as a conduit for the acceptance process among end users. The technology acceptance literature has been critiqued for its disregard to organizational dynamics (Legris et. al., 2003). The introduction of a new technology into workplace is in fact a change endeavor that is subject to contextual factors which affect individuals' reactions to the technology and its use. This study integrated organizational and social factors into a richer model of technology acceptance. This analysis and the results showed that this model has high explanatory and predictive power and is valuable in offering insights and

guidance for implementers initiating technology related changes within organizations.

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Appendix A: This email was the first recruiting e-mail

Introductory e-mail:

This E-mail is to introduce to you a PhD student at DePaul's CDM. Mohammed Al-Arabi has been following the SharePoint migration project for a while. His dissertation is built upon this project. As a prospective user for SharePoint once it is rolled out, you have been identified as a possible participant in his research. Your participation, if you agree to participate, will be in the form of taking an anonymous online survey which will approximately take 15-20 minutes of your time. No identifying information will be collected and the data analysis will be at the aggregate level. The data will not be shared with anyone and is for the sole use of the researcher.

Mohammed's survey mainly tries to look at the "pre-implementation" phase of the project from the respondent's perspective. Your participation is completely voluntary. If you don't wish to participate in taking the survey please reply to this e-mail within 2 days with the Subject Line: Opt out. By opting out you will not be sent the survey link by Mohammed.

Willing participants will be sent an e-mail by Mohammed containing a survey link with more information about his research.

Thank you for your cooperation.

Appendix B: Survey E-mail sent to perspective participants

Dear prospective participant,

You are being contacted as a potential participant in my research project for my PhD. My name is Mohanned Al-arabiat and I am PhD student at DePaul's CDM. I have been following the SharePoint Implementation project for quite some time now.

The survey mainly looks at the "pre-implementation" phase of the project from respondent's perspective. As a respondent you might want to think about the time when you first heard about the migration project.

Some of survey items might seem not related to the project or repetitive. This is intentional and is for research purposes.

Typically, the survey will take between 15-20 minutes to complete.

Your participation is completely voluntary. No identification data will be collected. The data is for my sole use and all data analysis will be at the aggregate level. For your convenience I attached the informed consent sheet which is also the first page once you click on the survey link below.

To take the surveys please click [\[here\]](#).

Sincerely,

Mohanned Al-arabiat

Appendix C: Informed Consent

INFORMATION SHEET FOR PARTICIPATION IN RESEARCH STUDY

Technology Acceptance: A Test of an Integrative Pre-implementation Model in a Mandatory Setting.

Principal Investigator: Mohammed M. Al-Arabi, College of Computing and Digital Media, PhD Student.

Institution: DePaul University, USA

Faculty Advisor: Dr. Norma Sutcliffe, PhD, College of Computing and Digital Media

We are conducting a research study because we are trying to learn more about technology acceptance among users in organizational settings. We are asking you to be in the research because you have been identified as a potential user for SharePoint as the university migrates from the older system. If you agree to be in this study, you will be asked to fill out an anonymous on-line survey. The on-line survey will include questions measuring expectations and perceptions; it aims at measuring user's perceptions during the pre-implementation phase of the project, that is, before the final "switch" to the SharePoint. While answering the questions please choose the answer that best describes/described your perceptions during that phase. We will also collect some personal information about you such as age, education, gender, and tenure at the university. If there is a question you do not want to answer, you may skip it at any point.

This study will take about 20 minutes of your time. Your information will be anonymous; no identifying information will be collected, and the analysis of the data will be at the aggregate level.

Your participation is voluntary, which means you can choose not to participate. There will be no negative consequences if you decide not to participate or change your mind later after you begin the study. You can withdraw your participation at any time prior to submitting your survey. If you change your mind later while answering the survey, you may simply exit the survey. Once you submit your responses, we will be unable to remove your data later from the study because all data is anonymous and we will not know which data belongs to you. Your decision whether or not to be in the research will not affect your status or employment at DePaul University.

If you have questions, concerns, or complaints about this study or you want to get additional information or provide input about this research, please contact Mohammed Al-Arabi, Tel: 708-668-3894, email: malarabi@cdm.depaul.edu, Or you may contact Dr. Norma Sutcliffe, (312)362-5084, NSutcliffe@cdm.depaul.edu.

If you have questions about your rights as a research subject you may contact Susan Loess-Perez, DePaul University's Director of Research Compliance, Office of Research Protections in the Office of Research Services at 312-362-7593 or by email at sloesspe@depaul.edu. You may also contact DePaul's Office of Research Protections if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.

You may keep [or print] this information for your records.